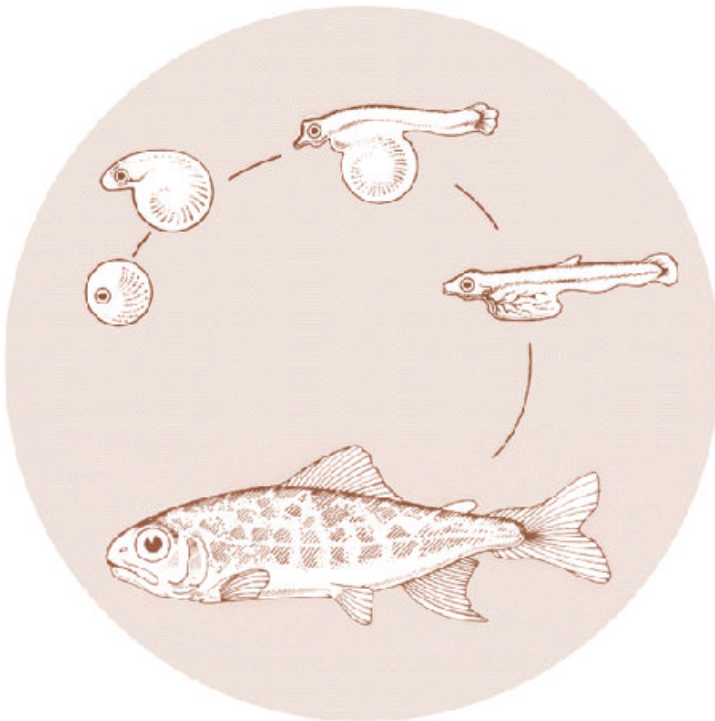


June 1997

# UMATILLA HATCHERY SATELLITE FACILITIES OPERATION AND MAINTENANCE

Annual Report 1996



DOE/BP-17622-11



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# UMATILLA HATCHERY SATELLITE FACILITIES OPERATION AND MAINTENANCE

Annual Report 1996

Prepared by:

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Project No. 83-435-00  
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June 1997

## ABSTRACT

The Confederated Tribes of the Umatilla Indian Reservation (CTUIR) and Oregon Department of Fish and Wildlife (ODFW) are cooperating in a joint effort to enhance steelhead and re-establish salmon runs in the Umatilla River Basin. As an integral part of this program, Bonifer Pond, **Minthorn** Springs, Imeqes C-mem-ini-kern and Thornhollow satellite facilities are operated for acclimation and release of juvenile summer steelhead (*Oncorhynchus mykiss*), fall and spring chinook salmon (*O. tshawytscha*) and **coho** salmon (*O. kisutch*). **Minthorn** is also used for holding and spawning adult summer steelhead and Three Mile Dam is used for holding and spawning adult fall chinook and **coho** salmon.

Acclimation of juvenile salmon and steelhead in 1996 occurred only in the spring. Summer steelhead were acclimated at Bonifer (49,377), **Minthorn** (47,543) and Thornhollow (49,783). Yearling and subyearling fall chinook salmon (204,022 and 853,598, respectively) were also acclimated at Thornhollow. At Imeqes C-mem-in&kern, 378,561 yearling spring chinook, 360,381 yearling fall chinook and 2,106,815 subyearling fall chinook were acclimated. No **coho** were acclimated in 1996. .

A total of 105 unmarked and 28 marked summer steelhead were collected for broodstock at Three Mile Dam from September 28, 1995, through April 8, 1996. An estimated 215,048 green eggs were taken from 40 females and were transferred to Umatilla Hatchery for incubation and rearing.

A total of 576 fall chinook salmon were collected for broodstock at Three Mile Dam from September 25 through November 24, 1996. An estimated 778,028 green eggs were taken from 202 females. The eggs were transferred to Umatilla Hatchery for incubation and rearing. Coho salmon broodstock were not collected in 1996.

Personnel from the ODFW Eastern Oregon Fish Pathology Laboratory in La Grande took samples of tissues and reproductive fluids from Umatilla River summer steelhead and fall chinook salmon broodstock for monitoring and evaluation purposes. Cell culture assays for replicating agents on spawned fish were negative. Tests for bacterial kidney disease (*Renibacterizm salmonarum*) were positive on 55 of 72 spawned summer steelhead and 42 of 139 spawned fall chinook females. One fall chinook had a clinical level of infection. Tests for whirling disease (*Myxobolus cerebralis*) on spawned summer steelhead were negative and furunculosis (*Aeromonas salmonicida*) was detected in 16 of 28 fall chinook mortalities examined.

Regular-y scheduled maintenance of pumps, equipment and facilities was performed in 1996. Critical maintenance and repair was performed by Umatilla Passage Facility Operation and Maintenance crews.

Coded-wire tag recovery information was accessed to determine the contribution of Umatilla River releases to ocean, Columbia River and Umatilla River fisheries. Total

estimated adult survival rates for individual summer steelhead releases made from 1988 to 1993 have ranged from 0.009 to 0.97%. Survival rates to the Umatilla River have ranged from 0.00 to 0.72%. Total estimated adult **coho** survival rates for releases made from 1987 to 1994 have ranged from 0.16 to 4.53%. Survival rates to the Umatilla River have ranged from 0.04 to 0.99%. Total estimated survival rates (through age-6, preliminary data) for spring chinook yearlings released in the spring from 1988 through 1991 have ranged from 0.18 to 0.95%. Survival rates to the Umatilla River have ranged from 0.16 to 0.77%. The total estimated adult survival rates for spring chinook released in the fall of 1988 through 1990 have ranged from 0.005 to **0.095%**, while escapement to the Umatilla River has ranged from 0.003 to 0.08%. Total estimated survival rates (through age-7, preliminary data) for individual fall chinook yearling releases made from 1983 through 1988 have ranged from 0.08 to 3.30%. Umatilla River survival rates have ranged from 0.00 to 0.90%. Total estimated survival rates for fall chinook subyearling spring releases made from 1984 to 1989 have ranged from 0.07 to 0.87%. Umatilla River survival rates have ranged from 0.00 to 0.02%. The total estimated adult survival rates for fall chinook subyearlings released in the fall of 1985 and 1988 have ranged from 0.43 to 0.67%. Escapement to the Umatilla River has ranged from 0.006 to 0.07%.

The progress of outmigration for juvenile releases was monitored at the **Westland** Canal juvenile facility by **CTUIR** and ODFW personnel. The majority of the juveniles migrated downstream by early June.

## ACKNOWLEDGEMENTS

This project was funded by Bonneville Power Administration (BPA). The Confederated Tribes of the Umatilla Indian Reservation (CTUIR) thank Jerry Bauer, Jay Marcotte and other BPA personnel for their assistance. Thanks are extended to Ray Hill, Mike Gribble, Jack Hurst, Warren Groberg, Sam Onjukka, Karen Waln and other Oregon Department of Fish and Wildlife (ODFW) personnel for providing assistance in the spawning of summer steelhead and fall chinook salmon and for monitoring the fish for the presence of pathogens. Bill Duke (ODFW) assisted with collection and transport of steelhead and fall chinook salmon broodstock and collection of data at Three Mile Dam and **Westland** Canal. Christine Mallette and Bill Murray (ODFW) retrieved and decoded coded-wire tags from adult fish snouts. John Leppink (ODFW) and Susan **Markey** (Washington Department of Fish and Wildlife), provided coded-wire tag recovery information. Bob Becker (ODFW) supervised and coordinated fish transfers to the acclimation facilities. Thanks go to Mike Hayes, Shannon **Focher**, Wes Stonecypher and Candi Healy (ODFW) for sharing their juvenile pre-release data and for assisting in the collection of fall chinook broodstock data. We thank landowners Rosemary and Wes Gladow and Richard Kaye for their cooperation and Union Pacific Railroad for providing access to the facilities. Thanks are also extended to the Umatilla Passage Facility Operation and Maintenance crews for maintaining the facilities.

Thanks go to the **CTUIR** staff for their cooperation and contributions to this report. Brian Zimmerman, Brian Conner, Larry Cowapoo, Vern Spencer, Mike Jones and Jim Marsh collected data from adults returning to Three Mile Dam and migration data for juvenile salmonids captured at the **Westland** Canal juvenile facility and assisted in the collection and transport of steelhead and fall chinook salmon broodstock. Paul Kissner and Melvin **Farrow** collected data and snouts from spawning ground surveys. Other biologists and technicians assisted in field sampling. Michelle Thompson provided the administration of the agreement, and Julie Burke and Celeste Reves provided office management and secretarial services. Gary James provided technical **oversite** and critical review of this report, and Craig Contor and Brian Zimmerman also provided critical review.

Thanks go to Mike **McCloud**, Louis Case, Tysen **Minthorn** and other technicians for the long hours and weekends spent operating the facilities and for collecting data.

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## INTRODUCTION

### Background

The Umatilla River Basin historically supported large runs of anadromous salmonids, including summer steelhead (*Oncorhynchus mykiss*), fall and spring chinook salmon (*O. tshawytscha*) and coho salmon (*O. kisutch*). The runs of chinook and coho salmon were essentially eliminated in the early 1900's. The losses have generally been attributed to the development of hydroelectric dams and to forestry, agriculture and irrigation practices. The single indigenous naturally spawning anadromous stock left in the Umatilla River Basin is a run of approximately 1,100 to 2,800 summer steelhead.

The Confederated Tribes of the Umatilla Indian Reservation (CTUIR) and Oregon Department of Fish and Wildlife (ODFW) began efforts to enhance steelhead and re-establish salmon runs in the Umatilla River Basin in the early 1980's. As an integral part of these efforts, Bonifer Pond (Bonifer), Minthorn Springs (Minthorn), Imeques C-mem-ini-kern (Imeques), Thornhollow and Three Mile Dam satellite facilities were constructed. The facilities are administered under the Fish and Wildlife Program of the Northwest Power Planning Council and are funded by Bonneville Power Administration (BPA).

The facilities are operated by CTUIR in cooperation with ODFW. Bonifer, Minthorn, Imeques and Thornhollow facilities are operated for acclimation and release of juvenile salmon and summer steelhead. Minthorn is also used for holding and spawning summer steelhead and Three Mile Dam is used for holding and spawning fall chinook and coho salmon. The main goal of acclimation is to reduce stress from trucking prior to release and improve imprinting of juvenile salmonids in the Umatilla River Basin. Juveniles are transported to the acclimation facilities primarily from Umatilla and Bonneville Hatcheries.

This report details activities associated with operation and maintenance of the Bonifer, Minthorn, Imeques, Thornhollow and Three Mile Dam facilities in 1996.

### Facility Descriptions and Operations

The Bonifer facility is located adjacent to Meacham Creek at rivermile (RM) 2 (Figure 1). The pond spills into Boston Canyon Creek which flows approximately 20 yards before entering Meacham Creek. Meacham Creek flows into the Umatilla River at RM 79. The facility consists of a 1.75-acre earthen pond and concrete outlet water control structure which also functions as a fish trap. The pond holds approximately 4.5 acre-feet of water and is fed by three nearby springs. Flows range from approximately 750 to 1,850 gallons per minute (gpm). Operations began in 1984.

The Minthorn facility is located approximately four miles east of Mission, Oregon (Figure 1). The facility is located on Minthorn Springs Creek which is formed from the inflow of several springs located immediately south of the Umatilla River. The creek is

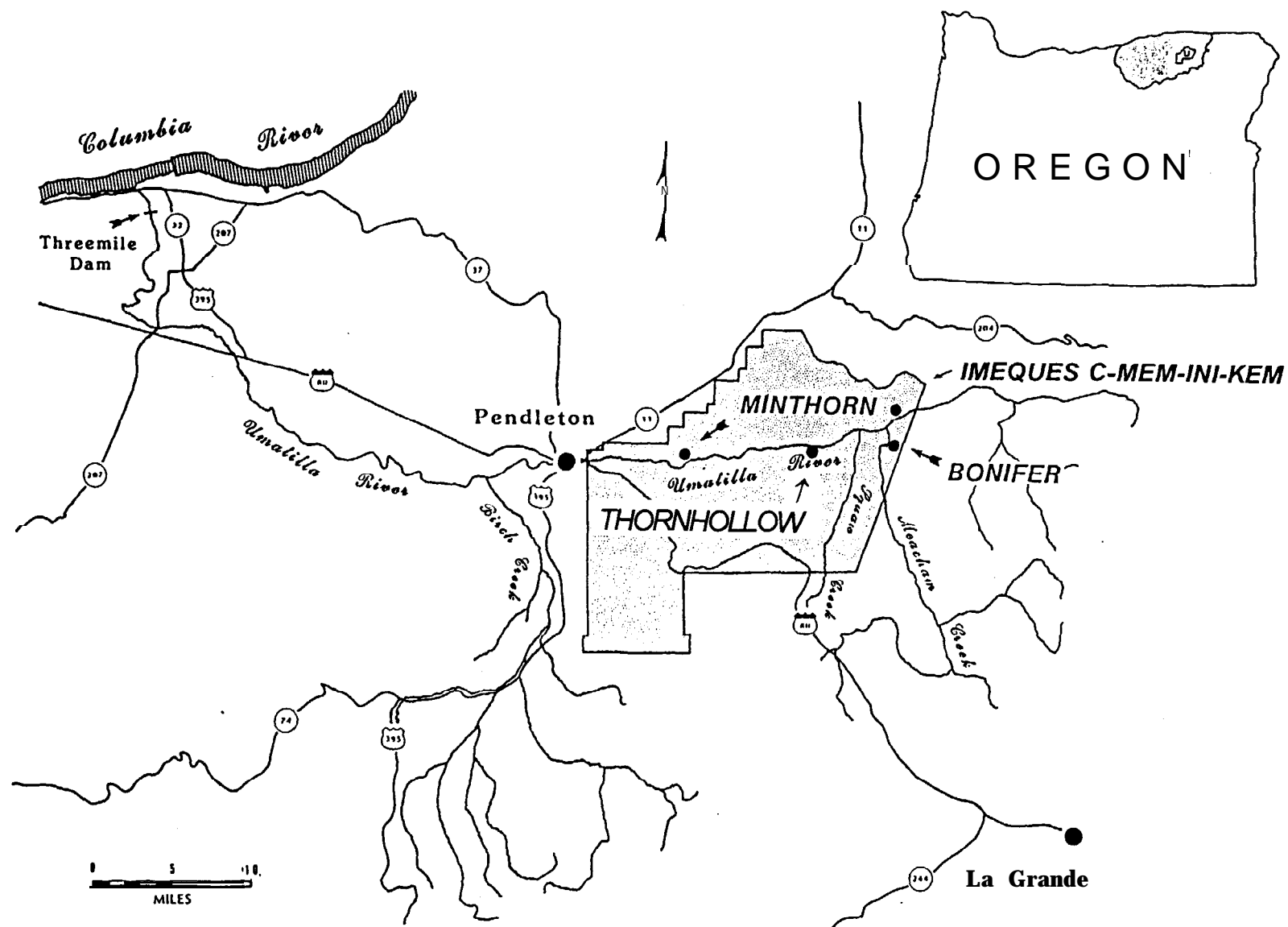


Figure 1. Confederated Tribes of the Umatilla Indian Reservation and Bonifer, Minthorn, Thornhollow, Imeques C-mem-ini-kern and Three Mile Dam satellite facilities.

approximately one mile long, with the facility located near the mouth at Umatilla RM 63.8. The facility includes two raceways (each 120 x 12 x 4 feet), pump station, emergency generator, outlet water control structure which also functions as a fish trap and summer steelhead broodstock holding area. Water through the brood holding area is supplied by gravity and ranges from approximately 500 to 2,100 gpm. Water supply to the raceways is pumped from the creek. Water depth is usually held at three feet with a single-pass water pumping rate of 800 gpm through each raceway. Two valves control the effluent water to allow for either recycling of flows into the intake pond or discharge downstream of the intake and adult holding area. **Minthorn** was first operated in 1986.

The Imeqes C-mem-ini-kern facility is located on the upper Umatilla River at RM 79.5 (Figure 1). The facility includes a water intake structure with automatic screen cleaner, water headbox/distribution system, storage building, four acclimation ponds (approximately 13,000 cubic feet each) and water outlet and fish release structure. Water is supplied by gravity flow (approximately 1,600 gpm per pond). Imeqes C-mem-ini-kern was completed and began operations in 1994.

The Thornhollow facility is located on the upper Umatilla River at RM 73.5 (Figure 1). The facility includes a water intake structure with automatic screen cleaner, pump station, water headbox/distribution system, storage building, two acclimation ponds (approximately 13,000 cubic feet each) and water outlet and fish release structure. Water is supplied by gravity flow to the pump station where it is pumped into the **headbox**. Water flow is approximately 1,600 gpm per pond. Thornhollow was completed and began operations in 1995.

The Three Mile Dam facility is located on the lower Umatilla River at approximately RM 4 (Figure 1). The facility includes a water intake system with automatic screen cleaning, pump station having a pumping capacity of 8,000 gpm, six adult holding ponds (each 90 x 10 x 6 foot effective water depth), mechanical fish crowder, visitor facilities including restrooms, standby emergency generator for process areas and life support systems and chemical storage, bunkhouse and spawning buildings. The bunkhouse includes two bunk rooms, kitchen area, office space, conference room, shop and restrooms. The spawning building includes a fish lift, electroshock anesthesia system, sorting and spawning facilities, wet and dry storage rooms, walk-in cooler and restroom.

### Project Objectives

The following project objectives for 1996 are part of overall objectives to operate and maintain the satellite facilities:

- Objective 1: Hold groups of juvenile salmonids at Bonifer, Minthorn, Imeqes C-mem-ini-kern and Thornhollow acclimation facilities prior to release into the Umatilla River Basin.



Task 1.1: Hold juvenile salmon and summer steelhead in facilities prior to release into the Umatilla River Basin.

Task 1.2: Monitor temperature and dissolved oxygen daily during acclimation.

Objective 2: Determine general trends in juvenile outmigration timing

Task 2.1: Cooperate in operation of **Westland** and/or Three Mile Dam juvenile **salmonid** traps during outmigration periods to collect species composition, numbers of fish trapped and marks.

Task 2.2: Compare information collected at the traps with pre-release data to give an indication of outmigration timing.

Objective 3: Provide summer steelhead, fall chinook and **coho** salmon eggs to ODFW for rearing and later release into the Umatilla River Basin.

Task 3.1: Collect, transport, hold and spawn summer steelhead, fall chinook and **coho** salmon.

Task 3.2: Assist ODFW in collecting samples from broodstock for disease analysis.

Objective 4: Determine total survival, contribution to ocean and Columbia River fisheries and escapement to the Umatilla River and other terminal areas of all coded-wire groups released in the Umatilla River Basin.

Task 4.1: Collect snouts and physical data from coded-wire tagged fish. Deliver snouts to ODFW for retrieval and decoding.

Task 4.2: Determine survival, contribution and escapement rates by collecting and expanding data from appropriate sources.

Objective 5: Maintain the facilities in good working order.

Task 5.1: Repair, maintain and service electrical. and mechanical equipment, ponds, pumps, water supply systems, screens, fencing, fishways, buildings and grounds.

Objective 6: Participate in planning process for new Umatilla Hatchery satellite facilities.

Task 6.1: Review and comment on engineering designs and follow up with engineers as necessary during planning and construction of Umatilla Hatchery satellite facilities located in the Umatilla and **Walla Walla** River Basins.

Objective 7: Disseminate information associated with the completion of above tasks.

Task 7.1: Write and submit an Annual Report to BPA summarizing operation and maintenance of the juvenile acclimation and adult holding and spawning facilities.

## **METHODS**

### **Objective 1: Juvenile Acclimation**

#### **Task 1.1: Juvenile Holding**

Juvenile summer steelhead and spring and fall chinook salmon were transported by ODFW from Umatilla and Bonneville Hatcheries to the acclimation facilities using 3,000 and 5,000 gallon fish transport trucks. Proposed acclimation periods were two weeks for fall chinook subyearlings and four weeks for spring and fall chinook yearlings and summer steelhead. The fish were fed Biomoist Feed (Bioproducts Inc., Warrenton, Oregon) twice each day. Fish were to be fed at a rate of approximately 1% body weight per day (BWD) for yearlings and 1.5% BWD for subyearlings. Mortalities were removed daily and ODFW pathology personnel were available to address specific disease problems.

The total number of fish released was estimated using ODFW Fish Liberation Reports and acclimation mortality records. The number of tagged fish released was estimated using ODFW Coded-Wire Tagging Operation Summaries, hatchery and acclimation mortality records and tag retention sampling prior to release.

ODFW personnel sampled the fish in all but one group the day of release for weight and fork length. Pre-release data reported for the group acclimated at Bonifer was taken at the hatchery prior to transport. Some groups of fish were also sampled for descaling the day of release. Partial descaling was defined as loss of greater than 3.0% and less than 16.0% of the scales on at least one side of the fish. Severe descaling was defined as loss of greater than 16.0% of the scales on at least one side.

#### **Task 1.2: Water Quality Monitoring**

Temperature and dissolved oxygen (DO) measurements were taken at the facilities during acclimation. Temperatures were recorded hourly by automatic digital temperature recorders (Ryan TempMentors). Dissolved oxygen measurements were taken daily with a YSI portable DO meter.

### **Objective 2: Juvenile Outmigration Monitoring**

#### **Task 2.1 and 2.2: Outmigration Data Collection and Analysis**

Juvenile salmonids were collected at the **Westland** Canal juvenile facility (RM 27) during trapping operations. The trap was monitored daily and fish were hauled as necessary by CTUIR and ODFW Trap and Haul personnel (Zimmerman et. al. 1996). The trap is located approximately 36.8, 46.5, 52.5 and 54.0 rivermiles downstream from Minthorn, Thornhollow, Imeques and Bonifer, respectively.

Juveniles were sampled a minimum of once per week during the entire juvenile trapping period. Species and fin marks were recorded on all fish and lengths were recorded on a portion of them. Weight samples were taken using standard hatchery practices to estimate the average size of the fish. The weight samples were used to estimate the total number of fish hauled on sampling days by multiplying the number of fish per pound by the number of pounds loaded.

### **Objective 3: Summer Steelhead, Fall Chinook and Coho Salmon Spawning**

#### **Task 3.1: Adult Collection, Holding and Spawning**

##### **Collection, Holding and Spawning of Summer Steelhead**

Summer steelhead were collected for broodstock through the cooperative efforts of CTUIR and ODFW. Fish were trapped at Three Mile Dam, located approximately four miles upstream from the mouth of the Umatilla River and were transported to **Minthorn** by CTUIR and ODFW Trap and Haul personnel using 370 or 3,000 gallon fish transport units.

To help maintain the genetic integrity of the hatchery population, the first priority for broodstock was to collect unmarked fish at a male to female ratio of **1:1** and at a rate of 10% of the total unmarked run by month. To ensure meeting the broodstock goal of 106 adults, coded-wire tagged hatchery fish (adipose and left ventral clipped) were also collected. The collection rate for coded-wire tagged fish was one coded-wire tagged fish for every two unmarked fish collected and at a male to female ratio of **1:1**.

Beginning the third week in January, 1996, broodstock were treated with **formalin** (Paracide-F, Argent Chemical Laboratories) to help control fungus. A one-hour **flow-through** treatment using five or 10 gallons of **formalin** was used two or three times per week, except fish were not treated during periods of high flow and turbidity.

Beginning the first week in April, broodstock were sorted weekly to determine maturation. Ripe fish were spawned by CTUIR and Umatilla and Irrigon Hatchery personnel using standard hatchery practices. A 3 x 3 spawning matrix was to be utilized whenever possible and matings were random except no hatchery x hatchery crosses were made. Eggs from each family group were water hardened in iodophor (Argentyne, Argent Chemical Laboratories) at 75 ppm for one hour and transferred to Umatilla Hatchery for incubation and rearing.

After the spawning season was completed, all remaining fish were sacrificed. Fork and MEHP lengths were taken on prespawn mortalities, spawned fish and excess fish sacrificed. MEHP length was defined as the distance from the middle of the eye to the end

of the hypural plate. Weights<sup>1</sup> and fin marks were recorded and snouts were collected from all coded-wire tagged fish. Scale samples were also collected from both hatchery and unmarked fish.

#### Collection, Holding and Spawning of Fall Chinook Salmon

Fall chinook salmon broodstock were collected and held at Three Mile Dam. From October 22 to November 18, 1996, broodstock were treated on seven occasions with **formalin** to help control fungus. A one-hour flow-through treatment at approximately 167 ppm was used.

Beginning in November, fish were sorted and spawned a minimum of once per week by **CTUIR** and ODFW personnel. A spawning ratio of **1:1** was utilized, but after fertilization, the eggs from four females were pooled to form one family group. The eggs were water hardened in iodophor at 75 ppm and transferred to Umatilla Hatchery for incubation and rearing.

After the spawning season was completed, remaining coded-wire tagged fish were sacrificed for coded-wire tag recovery and unmarked fish were released into the Umatilla River. Fork and MEHP lengths and weights were taken on prespawn mortalities, spawned fish and excess fish sacrificed. Fin marks were recorded and snouts **were collected** from all coded-wire tagged fish. Scale samples were also collected from a portion of both marked and unmarked fish.

#### Collection, Holding and Spawning of Coho Salmon

Coho salmon broodstock were not collected in 1996. Oregon Department of Fish and Wildlife hatcheries supplied all 1996 broodstock eggs for the Umatilla River program.

### **Task 3.2: Disease Sampling**

#### Disease Sampling of Summer Steelhead Broodstock

All spawned adult steelhead were sampled for the presence of selected pathogens by ODFW Northeast Oregon Fish Pathology Laboratory (NOFPL) in La Grande for monitoring and evaluation purposes as part of the Umatilla Hatchery Fish Health Monitoring Program. Reproductive fluid, pyloric caeca, kidney and spleen were sampled for replicating viral agents. Kidney samples were examined for bacterial kidney disease (*Renibacterium salmonicida*) and samples of head cartilage were examined for whirling disease (*Myxobolus cerebralis*).

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<sup>1</sup> Weights on spawned fish were taken after spawning.

Prespawn mortalities were also sampled for culturable bacteria. Kidney samples were taken to test for bacterial kidney disease (BKD) and other typical pathogens. Samples of the lower intestine were also examined for *Ceratomyxa Shasta*.

#### Disease Sampling of Fall Chinook Salmon Broodstock

Adult fall chinook salmon were also sampled for the presence of selected pathogens. Ovarian fluid, pyloric caeca, kidney and spleen samples from spawned females were assayed for replicating viral agents. Kidney samples were examined for bacterial kidney disease.

Prespawn mortalities were also sampled for culturable bacteria. Kidney samples were taken to test for BKD and other typical pathogens and samples of the lower intestine were examined for *Ceratomyxa shasta*.

#### Disease Sampling of Coho Salmon Broodstock

Coho salmon broodstock were not collected in 1996. Oregon Department of Fish and Wildlife hatcheries supplied all 1996 broodstock eggs for the Umatilla River program.

### **Objective 4: Adult Survival and Contributions**

#### **Task 4.1: Snout and Data Collection**

Snouts and associated biological data from coded-wire tagged salmonids were collected at Three Mile Dam and Minthorn. Snouts were also collected from Umatilla River creel and spawning ground surveys conducted through other **CTUIR** and ODFW programs. Snouts were sent to ODFW for tag removal and decoding.

#### **Task 4.2: Coded-Wire Tag Data Analysis**

#### Adult Survival and Umatilla River Returns

Data was accessed to compile adult survival and return information for all groups of coded-wire tagged fish released in the Umatilla River **Basin**. Coded-wire tagged recoveries from 1983 through 1996 were retrieved from the Pacific States Marine Fisheries Commission. Additional Oregon and Washington freshwater recoveries from 1996 were obtained from ODFW (John Leppink) and the Washington Department of Fish and Wildlife (Susan **Markey**). Some data are incomplete and should be considered as such. When the expanded coded-wire tagged recovery number was not available, the observed number was used.

Expanded estimates of all recoveries in the ocean, Columbia River and Umatilla River are calculated using observed coded-wire tag recoveries, sampling rates and total

number of fish released. All age groups are used in the expansion **estimates**<sup>2</sup>. In instances where untagged fish were not treated the same as tagged fish (e.g. untagged fish were reared at a different hatchery or were released at a different age than the tagged fish), these fish were not used in calculating expansions. Detailed information on recoveries is presented in Appendices A, B, C and D.

Exploitation rates were calculated for all representative release groups. Total exploitation rate is defined as all harvest and is divided into ocean commercial, Columbia River **gillnet**, ocean and freshwater sport, and ceremonial and subsistence treaty catches. Individual exploitation rates are calculated as a percent of the total exploitation rate.

#### Adult Returns to Minthorn

An adult V-trap was placed in the outlet water control structure at Mintliorn during the 1995-96 adult return season. The trap was monitored daily and all adult returns were examined for marks and sex and then were released back into **Minthorn** Springs Creek.

#### Adult Returns to Bonifer

An adult V-trap was not installed at Bonifer during the 1995-96 adult return season.

### **Objective 5: Facility Maintenance**

#### **Task 5.1: Facility Maintenance and Repair**

Maintenance, repair and service of electrical and mechanical equipment, ponds, pumps, water supply systems, screens, fencing, fishways, buildings and grounds was performed. Other maintenance was conducted as necessary.

### **Objective 6: Umatilla Satellite Facilities Planning**

#### **Task 6.1: Umatilla Satellite Facilities Review**

Meetings with **CTUIR**, BPA, ODFW and engineering and architectural firms were held to discuss designs for new Umatilla Hatchery satellite facilities scheduled for completion in the Umatilla and **Walla Walla** River Basins.

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<sup>2</sup> **Subjacks** were not included in estimates of fall chinook straying but are included in survival and contribution estimates.

## **Objective 7: Information Dissemination**

### **Task 7.1: Annual Report**

Data and information associated with the above tasks were compiled and this annual report, summarizing operation and maintenance of the **juvenile** acclimation and adult holding and spawning facilities, was written and submitted to BPA for dissemination.



## RESULTS AND DISCUSSION

### Objective 1: Juvenile Acclimation

#### Task 1.1 and 1.2: Juvenile Holding and Water Quality Monitoring

##### Acclimation and Release of Juvenile Salmonids

Fall chinook /salmon have been released in the Umatilla River Basin every year since 1982 and from acclimation facilities from 1983 to 1991 and in 1995 and 1996 (Table 1). The 1982 release was from Spring Creek tule stock (Table 2). Since then, all releases have been of upriver bright stock. Spring chinook salmon from Carson stock have been released since 1986 (Table 3) and from acclimation facilities from 1986 to 1992 and from 1994 through 1996 (Table 1). Summer steelhead of Skamania and Oxbow stocks were released from 1967 through 1970 (Table 4). In 1975, one release of Umatilla stock steelhead occurred and fish releases every year since 1981 have been from this stock. Summer steelhead have been released from acclimation facilities since 1984 (Table 5). Coho salmon have been released since 1987, and a portion have been acclimated when facilities and fish were available (Tables 5 and 6).

Three groups of acclimated summer steelhead (146,703 fish), one group of acclimated spring chinook (378,561 fish) and five groups of acclimated fall chinook (3,524,816 fish) were among the 5,527,463 salmon and steelhead released into the Umatilla River Basin in 1996 (Table 7). No releases of non-acclimated spring and fall chinook salmon and summer steelhead occurred in 1996. No coho salmon were acclimated in 1996.

##### Acclimation at Minthorn

###### Summer Steelhead

A group of 47,543 summer steelhead was acclimated at **Minthorn** for 29 days and released on April 12, 1996, at 5.1/lb. (Table 7). Included were 19,742 coded-wire tagged fish (adipose and left ventral fin clipped; Appendix E) and 27,801 adipose clipped only fish. They were fed 0.71% BWD and total mortality was 4.84% (Table 8). Following release, fish congregated at the end of the outlet channel and an estimated 2,372 fish (98.2% of the total mortality) died as a result of suffocation. The mean temperature and DO during acclimation was 9.4 degrees C and 11.1 mg/l, respectively (Table 8).

This was the second year that losses resulted from suffocation at the outlet following release. Future release strategies will include releasing the fish over a two day period and at night in an attempt to eliminate this problem.

Table 1. Juvenile fall and spring chinook salmon releases in the Umatilla River Basin (1982–1996). [1]

Year	Fall Chinook					Spring Chinook			
	Lower Umatilla	Upper Umatilla	Bonifer	Minthorn	Thornhollow	Imeques C-mem-ini-ken	Lower Umatilla	Upper Umatilla	Bonifer Imeques C-mem-ini-ken
1982	3,807,171 (sy) [1]								
1983		80,664 (y)	20,000 (y)						
1984	966,250 (sy) [3]	175,104 (y)	53,308 (y)						
1985	3,223,172 (sy) [3]	60,607 (y)	137,655 (y)						
			51,000 (sy) [4]						
1986	2,029,602 (sy) [3]		115,779 (y)	91,036 (y)			300,438 (sy)	98,970 (y)	
				36,674 (sy) [4]				75,000 [4]	
1987	1,476,830 (sy) [5]		12,363 (y)	111,143 [6]			169,100 (sy)	89,897 (y)	
1988	3,316,007 (sy) [5,7]	79,681 (sy) [8]	99,550 (y)	115,199 [9]			156,312 (y) [7]	210,496 [10]	107,427 [10]
1989	2,393,710 (sy)	296,576 [9]		78,825 (sy) [8]				164,786 [10]	160,734 [10]
1990		255,614 (y)		71,864 (sy) [8]			99,775 (y) [7]	195,425 [10]	194,703 [10]
		3,132,127 (sy) [11]							
1991	10,462 [12] (sy)	194,847 (y)		79,672 (sy)			5,937 [12] (y)	265,426 [10]	181,849 [10]
		3,166,079 (sy)							
1992	7,037 [12] (sy)	220,440 (y)					5,272 [12] (y)	1,674,466 [13]	109,101 (y)
		3,182,712 [14] (sy)							
1993	29,681 [15] (sy)	2,629,917 (sy)					10,952 [15] (y)	480,864 (y)	
		134,837 (y)						1,128,176 [16]	
1994	22,174 [15] (sy)	2,843,212 (sy)					8,890 [15] (y)	610,245 [y]	1,217,602 (16)
		283,453 (y)							
1995					227,088 (y)	1,904,875 (sy)			673,331 (y)
					561,423 (sy)				
1996					204,022 (y)	360,381 (y)			378,561 (y)
					853,598 (sy)	2,106,815 (sy)			

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[1] y = yearling releases; sy = subyearling releases; upper Umatilla River includes Meacham Creek

[2] Releases in 1982 were Tule stock; all others have been upriver brights.

[3] Released below Threemile Dam to avoid loss in irrigation diversions.

[4] Acclimated during the summer and released in the fall.

[5] Released at Steelhead Park near Hermiston.

[6] Includes yearling spring and subyearling summer releases.

[7] Released below Westland Dam.

[8] Released in the fall.

[9] Includes yearling spring and subyearling fall releases.

[10] Includes yearling spring and fall releases.

[11] Includes subyearling spring and fall releases.

[12] Passage evaluation releases at Threemile Dam.

[13] Includes yearling spring and fall releases and subyearling spring releases.

[14] Released at Barnhart (RM 42.5).

[15] Passage evaluation releases.

[16] Includes subyearling spring and yearling fall releases.

Table 2. Hatchery releases of fall chinook salmon in the Umatilla River Basin.

Year of Release	Hatchery	No. Released	No./lb.	Stock
1982	Bonneville	978,336	79.0	Tule
1982	Bonneville	2,828,835	92.0	Tule
1983	Bonneville	100,564	6.9	Bonneville URB
1984	Bonneville	226,412	8.6	Bonneville URB
1984	Bonneville	966,250	86.1	Bonneville URB
1985	Bonneville	3,223,172	92.3	Bonneville URB
1986	Bonneville	196,162	7.8	Bonneville URB
1986	Bonneville	51,000	16.2	Bonneville URB
1986	Irrigon	206,615	4.7 - 6.0	Bonneville URB
1986	Irrigon	2,029,602	86.0	Bonneville URB
1986	Irrigon	35,574	11.6	Bonneville URB
1987	Irrigon	1,476,830	60.4	Priest Rapids URB
1987	Bonneville	211,506	8.1 - 8.6	Bonneville URB
1987	Irrigon	2,000	20.0	Priest Rapids URB
1988	Irrigon	1,886,757	68.3	Priest Rapids URB
1988	Irrigon	1,429,250	93.1	Bonneville URB
1986	Irrigon	94,069	8.6 - 9.8	Priest Rapids URB
1988	Bonneville	200,341	8.8 - 10.2	Bonneville URB
1989	Bonneville	217,443	8.6	Bonneville URB
1989	Irrigon	2,393,710	66.6	Priest Rapids URB
1989	Irrigon	156,957	10.9 - 11.1	Priest Rapids URB
1990	Bonneville	255,614	8.2	Bonneville URB
1990	Irrigon	2,425,681	87.5	Bonneville URB
1990	Irrigon	629,600	82.4	Priest Rapids URB
1990	Irrigon	148,510	8.8 - 9.2	Bonneville URB
1991	Bonneville	194,647	7.8	Bonneville URB
1991	Irrigon	3,091,214	81.8	Bonneville URB
1991	Irrigon	10,462	80.0 - 94.0	Bonneville URB
1991	Irrigon	79,672	80.5	Bonneville URB
1991	Irrigon	74,865	86.0	Bonneville URB
1992	Bonneville	122,639	7.7	Bonneville URB
1992	Bonneville	97,801	7.6	Bonneville URB
1992	Umatilla	2,678,343	55.2 - 70.6	Bonneville URB
1992	Umatilla	2,670	112.0	Bonneville URB
1992	Irrigon	504,369	53.4	Umatilla River
1992	Irrigon	5,167	628	Umatilla River
1993	Bonneville	134,837	9.1	Bonneville URB
1993	Umatilla	2,629,917	627	Upriver Brights /a
1993	Umatilla	29,681	96.6 - 142.0	Upriver Brights /a
1994	Bonneville	283,453	0.6 - 10.4	Bonneville URB
1994	Umatilla	2,843,212	65.2	Upriver Brights /b
1994	Umatilla	22,174	86.0 - 171.0	Upriver Brights /b
1996	Bonneville	227,088	8.0	Bonneville URB
1995	Umatilla	561,423	64.7	Priest Rapids URB
1996	Umatilla	1,904,875	63.1	Priest Rapids URB
1996	Bonneville	217,294	7.0	Bonneville URB
1996	Umatilla	143,087	5.1	Priest Rapids URB
1996	Bonneville	204,022	7.1	Bonneville URB
1996	Umatilla	2,106,815	65.1	Priest Rapids URB
1996	Umatilla	853,598	65.8	Priest Rapids URB

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Ja Bonneville and Umatilla River stock.  
/b Priest Rapids and Umatilla River stock.

Table 3. Hatchery releases of spring chinook salmon in the **Umatilla** River Basin.

Year of Release	Hatchery	No. Released	No./lb.	Stock
1986	Carson	99,970	22.8	Carson
1986	<b>Irrigon</b>	300,438	87.0	Carson
1986	Irdgon	75,000	15.0	Carson
1987	Carson	99,697	10.4	Carson
1987	Oxbow	169,100	199.0	Carson
1988	Bonneville	1,196	21.4	Carson /a
1988	Carson	99,895	20.6	Carson
1988	Bonneville	297,377	8.3-10.3	Carson
1988	Bonneville	75,767	11.1	Carson /a
1989	Bonneville	325,520	10.6-12.0	Carson la
1990	Carson	99,775	18.6	Carson
1990	Bonneville	231,772	9.0-9.6	Carson /a
1990	Bonneville	80,438	11.5	Carson la
1990	Bonneville	77,998	13.4	Carson /a
1991	Carson	90,796	20.6	Carson
1991	Carson	5,937	16.9	Carson
1991	Bonneville	100,505	10.1	Carson /a
1991	Bonneville	96,152	11.8	Carson /a
1991	Bonneville	81,144	16.5	Carson /b
1991	Bonneville	78,480	16.8	Carson /b
1992	Carson	90,982	18.7	Carson
1992	Carson	5,272	18.7	Carson
1992	Bonneville	109,101	9.2	Carson /a
1992	Bonneville	98,928	8.5	Carson la
1992	Umatilla	955,752	35.4	Carson
1992	<b>Irrigon</b>	294,458	32.5	Carson
1992	Bonneville	132,929	11.5	Carson
1992	Umatilla	101,416	19.4	Carson
1993	Bonneville	186,948	14.5	Carson
1993	Umatilla	208,782	8.3	Carson
1993	Carson	85,134	20.3	Carson
1993	Carson	10,952	20.0-20.5	Carson
1993	Umatilla	667,367	27.6	Carson
1993	Umatilla	460,809	19.9	Carson
1994	Umatilla	205,143	8.4	Carson
1994	Bonneville	152,854	11.5	Carson
1994	Bonneville	252,248	12.3	Carson
1994	Umatilla	8,890	<b>8.1-8.3</b>	Carson
1994	Umatilla	839,377	30.4	Carson
1994	Umatilla	378,225	a.7	Carson
1995	Bonneville	247,871	10.3	Carson
1995	Umatilla	275,804	7.9	Carson
1995	Bonneville	74,735	14.4	Carson
1995	Bonneville	74,921	11.4	Carson
1996	Umatilla	378,561	8.9	Carson

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/a Carson via Lookingglass stock.

/b Carson via Lookingglass, Umatilla River and Big Canyon stock.

**Table 4. Hatchery releases of summer steelhead in the Umatilla River Basin.**

Year of Release	Hatchery	No. Released	No./lb.	Stock
1967	Gnat Creek	109,805	75.0	Skamania
1967	Oak Springs	238,020	117.0	Idaho (Oxbow)
1967	<b>Wallowa</b>	142,240	240.0	Idaho (Oxbow)
1966	Gnat Creek	23,100	66.0	Skamania
1966	Gnat Creek	150,000	<b>Eggs</b>	Skamania
1969	Oak Springs	174,341	145.0	Skamania
1970	Carson	39,489	<b>8.0-9.0</b>	Skamania
1975	Wizard Falls	11,094	9.0	Umatilla River
1981	Oak Springs	17,558	6.0-9.0	Umatilla River
1981	Oak Springs	9,400	145.0	Umatilla River
1982	Oak Springs	59,494	<b>7.0-8.0</b>	Umatilla River
1982	Oak Springs	67,940	124.0	Umatilla River
1983	Oak Springs	60,500	11.0	Umatilla River
1983	Oak Springs	52,700	62.0	Umatilla River
1984	Oak Springs	57,939	6.5	Umatilla River
1984	Oak Springs	22,000	135.0	Umatilla River
1985	Oak Springs	53,850	7.0	Umatilla River
1985	Oak Springs	39,134	150.0	Umatilla River
1986	Oak Springs	54,137	8.4	Umatilla River
1987	Oak Springs	1,485	5.5	Umatilla River
1988	Oak Springs	95,290	6.5-10.3	Umatilla River
1988	Oak Springs	10,033	57.5	Umatilla River
1988	Irrigon	24,618	3200.0	Umatilla River
1989	Oak Springs	81,712	5.5-6.6	Umatilla River
1990	Oak Springs	29,522	7.7	Umatilla River
1990	Oak Springs	30,225	5.9	Umatilla River
1990	Oak Springs	29,446	5.5	Umatilla River
1991	Oak Springs	30,221	6.2	Umatilla River
1991	Oak Springs	<b>29,325</b>	8.7	Umatilla River
1991	Oak Springs	12,389	7.5	Umatilla River
1991	Oak Springs	3,998	12.5	Umatilla River
1992	Umatilla	19,977	5.8	Umatilla River
1992	Umatilla	47,458	5.8	Umatilla River
1992	Umatilla	64,550	5.0	Umatilla River
1992	Umatilla	67,419	5.5	Umatilla River
1992	Umatilla	5,443	5.8	Umatilla River
1993	Umatilla	44,824	4.5	Umatilla River
1993	Umatilla	47,979	5.6	Umatilla River
1993	Umatilla	65,465	6.1	Umatilla River
1994	Umatilla	51,403	4.9	Umatilla River
1994	Umatilla	49,598	5.1	Umatilla River
1994	Umatilla	52,097	5.2	Umatilla River
1994	Umatilla	1,732	5.7	Umatilla River
1995	Umatilla	48,539	5.6	Umatilla River
1995	Umatilla	49,983	4.7	Umatilla River
1995	Umatilla	47,941	5.5	Umatilla River
1996	Umatilla	47,543	5.1	Umatilla River
1996	Umatilla	49,377	5.3	Umatilla River
1996	Umatilla	49,783	5.1	Umatilla River

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Table 5. Juvenile summer steelhead and coho salmon releases in the Umatilla River Basin (1981 – 1996) [1].

Year	Summer Steelhead					Coho		
	Lower Umatilla	Upper Umatilla	Minthorn	Bonifer	Thornhollow	Lower Umatilla	Upper Umatilla	Minthorn
1981		17,558 (y)						
		9,400 (sy)						
1982		59,494 (y)						
		67,940 (sy)						
1983		60,500 (y)						
		52,700 (sy)						
1984				57,939 (y)				
				22,000 (sy)				
1985				53,850 (y)				
				39,134 (sy)				
1986				54,137 (y)				
1987		1,485 (y)[2]				766,660 (y)[3]		161,669 (y)
1988	33,984 (y)[3]	40,790 [4&5]	30,549 (y)			996,433 (y)[3]		
1989		29,586 (y)	29,852 (y)	22,274 (y)			829,607 (y)	157,299 (y)
1990		29,446 (y)		59,747 (y)		202,315 [6](y)	654,209 (y)	132,404 (y)
1991	3,998 [7](y)	29,325 (y)		42,610 (y)			802,655 (y)	152,974 (y)
1992	5,443 [7](y)	131,969 (y)	47,456 (y)	19,977 (y)			961,386 (y)	
1993			47,979 (y)	110,299 (y)		437,664 [8](y)	454,794 (y)	
1994	1,732 [7](y)		49,596 (y)	103,500 (y)		416,222 [8](y)	466,663 (y)	
1995			49,983 (y)	96,480 (y)		624,963 [8](y)	689,303 (y)	
1996			47,543 (y)	49,377 (y)	49,763 (y)	977,376 [8](y)	500,005 (y)	

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[1] y = yearling releases; sy = subyearling releases; upper Umatilla River includes Meacham Creek.

[2] Small release due to H-N 8 IPN problems in eggs.

[3] Fish released below Westland Dam.

[4] Includes both experimental control group and gradeouts from 88 brood year.

[5] Does not include any unfed fry that were released.

[6] Released at RM 23

[7] Passage evaluation releases.

[8] Released at RM 42.5

Table 6. **Hatchery** releases of **coho** salmon in the Umatilla River Basin.

Year of Release	Hatchery	No. Released	No./lb.	Stock
1966	Little White Salmon	500,000	1312.0	Little White Salmon
1967	Little White Salmon	200,000	1087.0	Little White Salmon
1967	Cascade	500,000	<b>Eggs</b>	Tanner Creek
1968	Little White Salmon	750,000	<b>Eggs</b>	Little White Salmon
1969	Cascade	200,040	23.0	Little White Salmon
1987	Cascade	948,549	13.5-14.0	Tanner Creek
1988	Cascade	996,433	16.6	Tanner Creek
1989	Cascade	753,637	<b>15.3–</b> 19.7	Tanner Creek
1989	Cascade	233,269	17.2-19.1	Tanner Creek
1990	Cascade	796,842	14.7	Tanner Creek
1990	Cascade	192,086	11.2-13.5	Tanner Creek
1991	Cascade	152,974	15.4	Tanner Creek
1991	Cascade	228,293	16.5	Tanner Creek
1991	Cascade	221,385	16.6	Tanner Creek
1991	Cascade	143,054	16.4	Tanner Creek
1991	Cascade	209,923	17.1	Tanner Creek
1992	Cascade	489,165	15.7	Tanner Creek
1992	Cascade	472,221	15.5	Tanner Creek
1993	Cascade	437,884	17.5	Tanner Creek
1993	Cascade	454,794	17.6	Tanner Creek
1994	Cascade	465,883	17.1	Tanner Creek
1994	Cascade	418,222	18.1	Tanner Creek
1995	Cascade	502,105	14.7	Tanner Cr. & Umatilla R.
1995	Cascade	497,449	14.5	Tanner Cr. & Umatilla R.
1995	Sandy	191,854	13.9	Tanner Creek
1995	Lower Herman Cr.	322,858	20.3	Tanner Creek
1996	Lower Herman Cr.	465,769	17.9	Tanner Creek
1996	Cascade	500,005	18.0	Tanner Creek
1996	Cascade	511,609	18.6	Tanner Creek

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**TABLE 7. JUVENILE SALMON AND SUMMER STEELHEAD RELEASES IN THE UMATILLA RIVER BASIN IN 1996.**

SPECIES	BROOD	STOCK	HATCHERY	NUMBER	#/LB.	LOCATION	IN FACILITY	IN RIVER	FISH MARK	# MARKED
FALL CHINOOK	94	COL. R. URB	BONNEVILLE	204,022	7.1	THORNHOLLOW (RM 73.5)	FEB. 22/MAR 8	APRIL 5	AdRVCWT RVBWT	27,397 176,625
FALL CHINOOK	94	COL. R. URB	BONNEVILLE	217,294	7.0	IMEQUES C-MEM-INI-KEM (RM 80)	MARCH 19/21	APRIL 18	AdRVCWT RVBWT	28,521 188,773
FALL CHINOOK	94	WASH. URB	UMATILLA	143,087	5.1	IMEQUES C-MEM-INI-KEM (RM 80)	MARCH 18/19	APRIL 18	AdRVCWT RVBWT	70,023 73,064
FALL CHINOOK	95	WASH. URB	UMATILLA	2,106,815	65.1	IMEQUES C-MEM-INI-KEM (RM 80)	MAY 15/16	MAY 30	AdRVCWT RVBWT	239,728 1,867,087
FALL CHINOOK	95	WASH. URB	UMATILLA	<u>853,598</u>	65.8	THORNHOLLOW (RM 73.5)	MAY 16/17	MAY 31	AdRVCWT RVBWT	58,328 795,270
SUBTOTAL				3,524,816						
SPRING CHINOOK	94	CARSON	UMATILLA	378,561	8.9	IMEQUES C-MEM-INI-KEM (RM 80)	FEB. 20/22	MARCH 13	AdLVCWT LV ONLY	137,208 241,353
19 c o l i c	94	TANNERCR.	CASCADE	511,609	18.6	UMATILLA RM 42.5	-----	APRIL 3/12	AdCWT	25,878
COHO	94	TANNERCR	CASCADE	500,005	18.0	UMATILLA RM 60	-----	APRIL 2/3	AdCWT	26,319
COHO	94	TANNERCR	L HERMAN CR	<u>465,769</u>	17.9	UMATILLA RM 42.6	-----	MARCH 18/25	AdCWT	26,860
SUBTOTAL				1,477,383						
SUMMER STHD.	95	UMATILLA R.	UMATILLA	47,543	5.1	MINI-HORN (RM 63)	MARCH 14	APRIL 12	AdLVCWT Ad ONLY	19,742 27,901
SUMMER STHD.	95	UMATILLA R.	UMATILLA	49,377	6.3	BONIFER (RM 2)	MARCH 13	APRIL 24/26	AdLVCWT Ad ONLY	21,205 28,172
SUMMER STHD.	95	UMATILLA R.	UMATILLA	49,783	6.1	THORNHOLLOW (RM 73.5)	APRIL 16/17	MAY 9	AdLVCWT Ad ONLY	20,633 29,150
SUBTOTAL				146,703						
TOTAL				<u>5,527,463</u>						



Table 8. Food rations, mortalities, temperatures and D.O. concentrations during acclimation of juvenile summer steelhead and spring and fall chinook salmon at Bonifer, Minthorn, Thomhobwand Imeques C-mem-ini-km acclimation facilities in 1996.

Species	Release Location	Release Date	Days Held	Food Fed (%/day)	Mortality			Temperature (C)			D.O. (mg/l)		
					5 Day	Total	%	Min.	Max.	Mean	Min.	Max.	Mean
Summer Steelhead	Minthorn	April 12	29	0.71	30	2,416 /a	4.64	7.5	10.7	9.4	9.3	12.9	11.1
Summer Steelhead	Bonifer	April 24/26	42-44	0.23	21	93	0.19	3.5	11.0	7.3	12.1	12.8	12.5
Summer Steelhead	Thomhollow	May 9	22-23	0.71	78	97	0.19	5.1	9.5	6.3	-	-	-
Spring Chinook	Imeques C-man-Id-km	March 13	m - 22	0.38	791	2,561	0.67	1.3	6.0	3.7	10.0	13.6	12.0
Fall Chinook	Thomhollow	April 5	28-45	0.47	789	2,953	1.43	1.4	7.6	4.6	9.2	14.6	12.2
Fall Chinook	Imeques C-mem-ini-kem	April 10	28-30	0.43	807	1,363	0.62	3.6	9.7	5.7	-	-	-
Fall Chinook	Imeques C-man-Id-kern	April 18	m-31	0.43	504	657	0.60	3.6	9.7	5.7	-	-	-
Fall Chinook	Thomhollow	May 31	14-15	1.39	202	1,633	0.19	8.5	12.2	9.4	-	-	-
Fall Chinook	Imeques C-mem-ini-kem	May 30	14-15	1.05	705	3,960	0.19	7.0	9.8	8.2	-	-	-
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/a 2,372 suffocated at the outlet during release.

The average fork length was 207 mm (Table 9). The length frequency distribution is shown in Figure 2. An estimated 31.0% were partially descaled while 0.5% were severely descaled (Table 9).

## Acclimation at Bonifer

### Summer Steelhead

A group of 49,377 summer steelhead at **5.3/lb.** was released from Bonifer between April 24 and April 26 after being acclimated for 42 to 44 days (Table 7). This included 21,205 coded-wire tagged fish (adipose and left ventral fin clipped; Appendix E) and 28,172 adipose clipped only fish. The fish were fed 0.23% BWD and total mortality was 0.19% (Table 8). The mean temperature and DO was 7.3 degrees C and 12.5 mg/l, respectively (Table 8).

**Table 9. Size and descaling data for juvenile summer steelhead and spring and fall chinook salmon released in the Umatilla River Basin in 1996**

Species	Release Location	Release Date	Days Held	No./lb.			Fork Ln. (mm)			Descaling (%)			
				Mean	Std.	n=	Mean	Std.	n=	Total	Partial	None	n=
Summer Steelhead	Minthorn	April 12	29	5.1	1.6	102	207	21	311	0.5	31.0	68.5	167
Summer Steelhead	Bonifer	April 24/26	42-44	5.3	1.6	51	196	17	101	--	- -	- -	- -
Summer Steelhead	Thornhollow	May 9	22-23	5.1	2.0	100	208	19	303	3.0	66.5	27.6	203
Spring Chinook	Imeques C-men-ini-kem	Match 13	20-22	8.9	3.0	431	185	18	1,132	28	36.8	66.4	214
Fal Chinook	Thornhollow	April 5	2 8 - 4 5	7.1	2.6	204	178	16	604	5.3	57.3	37.3	415
Fal Chinook	Imeques C-men-hi-kern	April 18	28-30	5.1	2.5	208	196	20	600	6.3	87.5	6.3	208
Fal Chinook	Imeques C-men-hi-kern	April 18	30-31	7.0	2.3	219	161	15	598	1.8	42.3	55.9	222
Fal Chinook	Thornholbw	May 31	14-15	65.8	17.6	447	86	7	612	--	- -	- -	- -
Fal Chinook	Imeques C-men-ini-kem	May 30	14-15	65.1	20.0	868	07	7	1,247	--	- -	- -	- -

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This group was scheduled for release in mid-April, but extremely high flows in Boston Canyon Creek deposited large amounts of rock and gravel at the pond outlet, making it impossible to drain the pond. Delays in getting the rock removed resulted in postponement of the release, but in late April, both Boston Canyon Creek and Meacham Creek flooded and the pond overflowed, allowing the juveniles to escape.

The average fork length taken at the hatchery prior to transport was 196 mm (Table 9). The length frequency distribution of this group is shown in Figure 3. These fish were not examined for descaling prior to release.

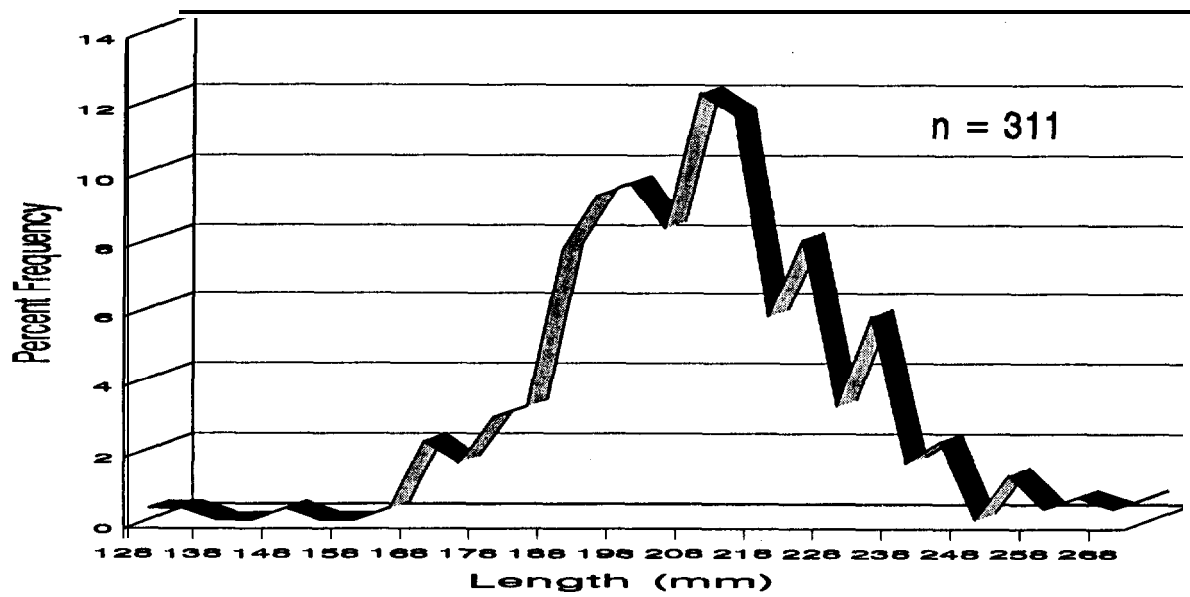


Figure 2. Length frequency distribution of juvenile summer steelhead released at Minthorn Acclimation Facility on, 4/12/96.

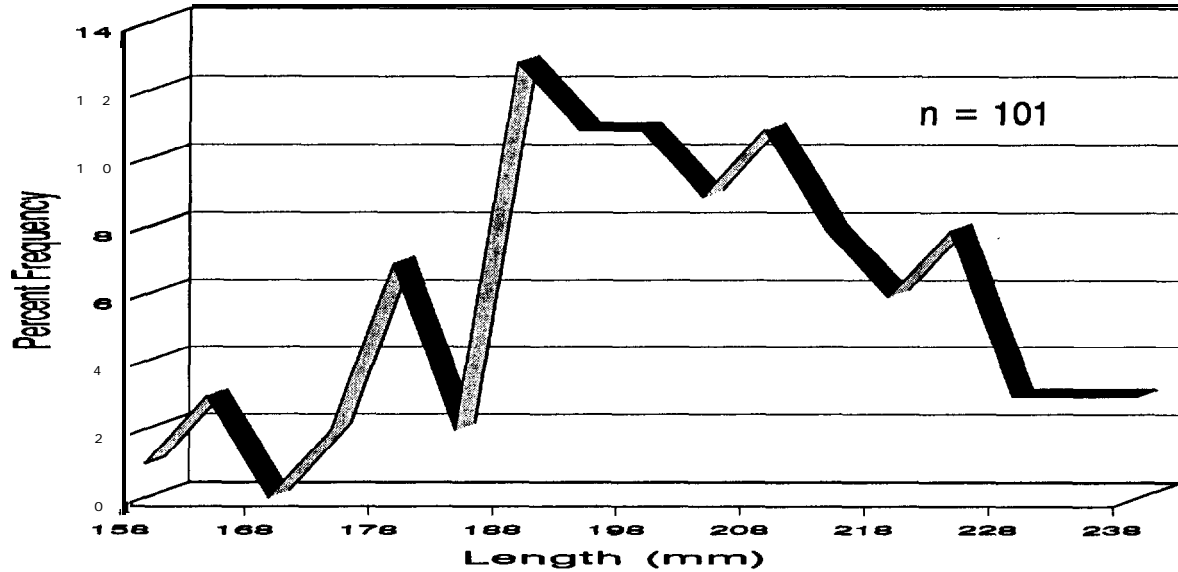


Figure 3. Length frequency distribution of juvenile summer steelhead released at Bonifer Acclimation Facility between 4/24 and 4/26/96.

## Acclimation at Thornhollow

### Summer Steelhead

A group of 49,783 summer steelhead at **5.1/lb.** was released from Thornhollow on May 9, 1996, after being acclimated for 22 to 23 days (Table 7). Included were an estimated 20,633 coded-wire tagged fish (adipose and left ventral fin clipped; Appendix E) and 29,150 adipose clipped only fish. They were fed 0.71% BWD and total mortality was 0.19% (Table 8). The mean temperature was 6.3 degrees C (Table 8). Dissolved oxygen measurements were not taken because the DO meter was sent in for repairs.

The average fork length was 208 mm (Table 9). The length frequency distribution is shown in Figure 4. An estimated 3.0 and 69.5% were severely and partially descaled, respectively (Table 9).

### Fall Chinook

An estimated 204,022 fall chinook yearlings at **7.1/lb.** were released from Thornhollow on April 5, 1996, after being acclimated for 28 to 45 days (Table 7). This included 27,397 coded-wire tagged fish (adipose and right ventral clipped; Appendix F) and 176,625 right ventral clipped and blank wire tagged fish. They were fed 0.47% BWD and total mortality was 1.43% (Table 8). The mean temperature and DO was 4.6 degrees C and 12.2 mg/l, respectively (Table 8).

This group of fish was sampled by ODFW pathology personnel on March 20, 1996, because of unusually high losses. Microscopic examinations were negative for parasites and erythrocytic inclusion body syndrome (EIBS). Culture examinations indicated low levels of cold water disease bacteria (*Flexibacter psychrophilus*) in four of 11 fish. No clinical signs of **BKD** were observed. These fish were sampled again on April 2 for a preliberation examination. EIBS was detected in two of 11 fish and bacterial gill disease was detected in one of two fish. Kidney samples from 19 fish were taken to test for BKD and 16 tested positive. These all had ELISA readings of 0.153 or less, indicating low level positives. Cold water disease bacteria was detected in eight of nine fish and at a clinical level in three of these. The fish were cleared for liberation.

The average fork length was 178 mm (Table 9). The length frequency distribution is shown in Figure 5. An estimated 57.3% were partially descaled while 5.3% were severely descaled (Table 9).

An estimated 853,598 fall chinook subyearlings at **65.8/lb.** were released from Thornhollow on May 31, 1996, after being acclimated for 14 to 15 days (Table 7). This included 58,328 coded-wire tagged fish (adipose and right ventral clipped; Appendix F) and 795,270 right ventral clipped and blank wire tagged fish. They were fed 1.39% BWD and total mortality was 0.19% (Table 8). The mean temperature was 9.4 degrees C (Table 8).

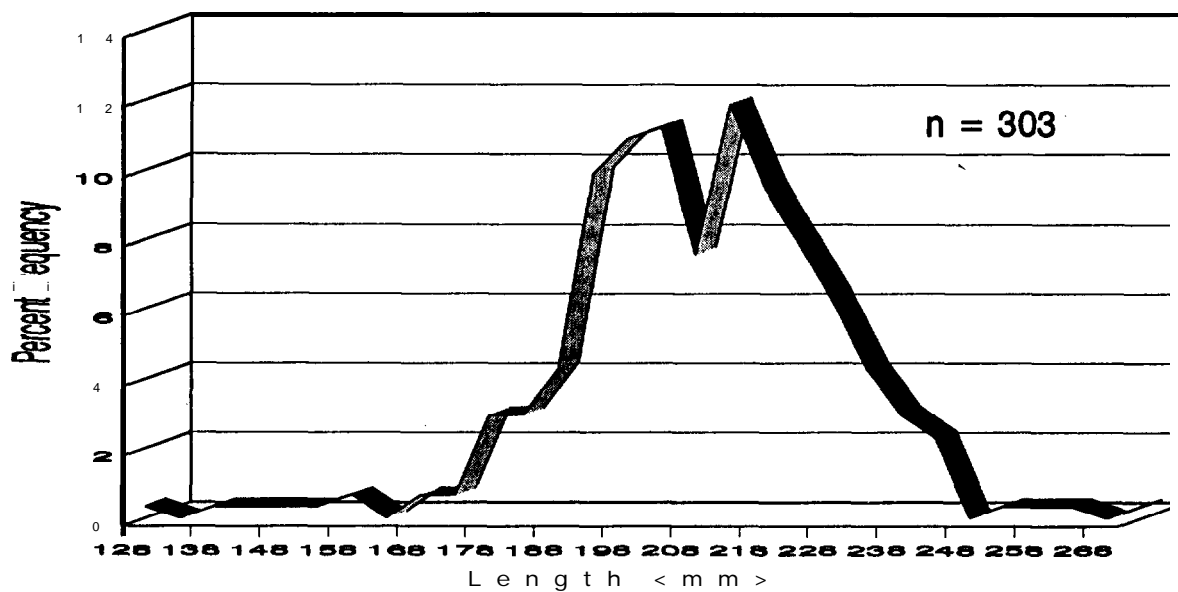


Figure 4. Length frequency distribution of juvenile summer steelhead released at Thornhollow Acclimation Facility on 5/9/96.

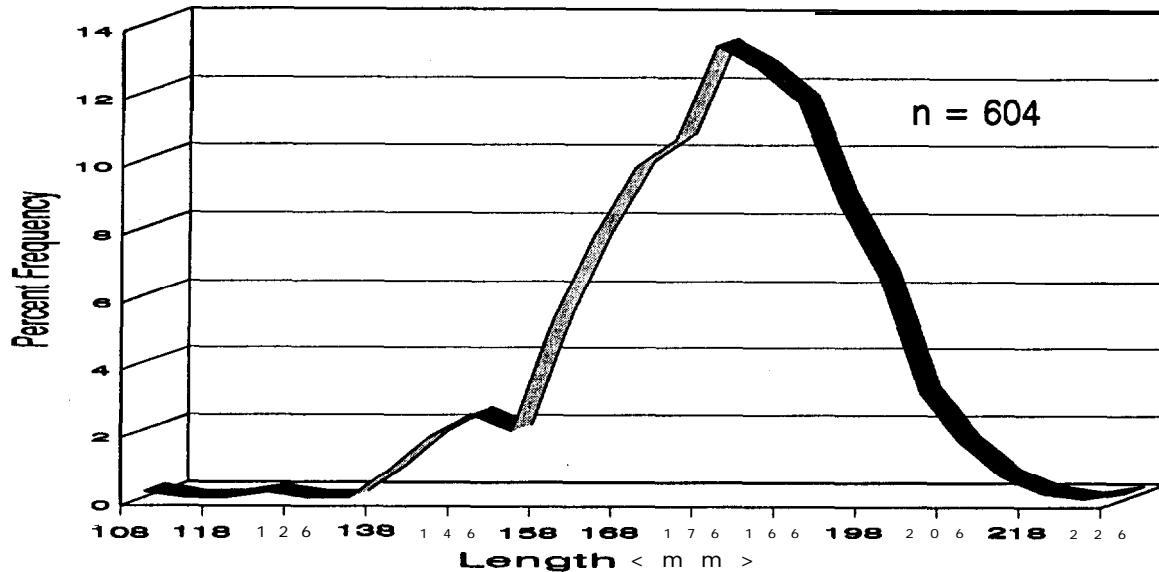


Figure 5. Length frequency distribution of juvenile fall chinook salmon released at Thornhollow Acclimation Facility on 4/5/96.

Dissolved oxygen measurements were not taken because the DO meter had to be sent in for repairs.

The average fork length was 86 mm (Table 9). The length frequency distribution of this group is shown in Figure 6. These fish were not sampled for descaling prior to release.

#### Acclimation at Imeques C-mem-ini-kern

##### Spring Chinook

An estimated 378,561 spring chinook yearlings at **8.9/lb.** were released from Imeques on March 13, 1996, after being acclimated for 20 to 22 days (Table 7). This included 137,208 coded-wire tagged fish (adipose and left ventral clipped; Appendix G) and 241,353 left ventral clipped fish. They were fed 0.38% BWD and total mortality was 0.67% (Table 8). The mean temperature and DO was 3.7 degrees C and 12.0 mg/l, respectively (Table 8).

The average fork length was 165 mm (Table 9). The length frequency distribution of this group is shown in Figure 7. An estimated 2.8 and 30.8% were severely and partially descaled, respectively (Table 9).

##### Fall Chinook

One group of 217,294 fall chinook yearlings at **7.0/lb.** was acclimated at Imeques and released on April 18, 1996, after being acclimated for 28 to 30 days (Table 7). This included 28,521 coded-wire tagged fish (adipose and right ventral clipped; Appendix F) and 188,773 right ventral clipped and blank wire tagged fish. They were fed 0.43% BWD and total mortality was 0.62% (Table 8). The mean temperature was 5.7 degrees C (Table 8). Dissolved oxygen measurements were not taken because the DO meter had to be sent in for repairs.

The average fork length was 181 mm (Table 9). The length frequency distribution of this group is shown in Figure 8. An estimated 42.3% were partially descaled, while 1.8% were considered severely descaled (Table 9).

A second group of 143,087 fall chinook yearlings at **5.1/lb.** were also released from Imeques on April 18, 1996, after being acclimated for 30 to 31 days (Table 7). This included 70,023 coded-wire tagged fish (adipose and right ventral clipped; Appendix F) and 73,064 right ventral clipped and blank wire tagged fish. They were fed 0.43% BWD and total mortality was 0.60% (Table 8). The mean temperature was 5.7 degrees C (Table 8). Dissolved oxygen measurements were not taken because the DO meter had to be sent in for repairs.

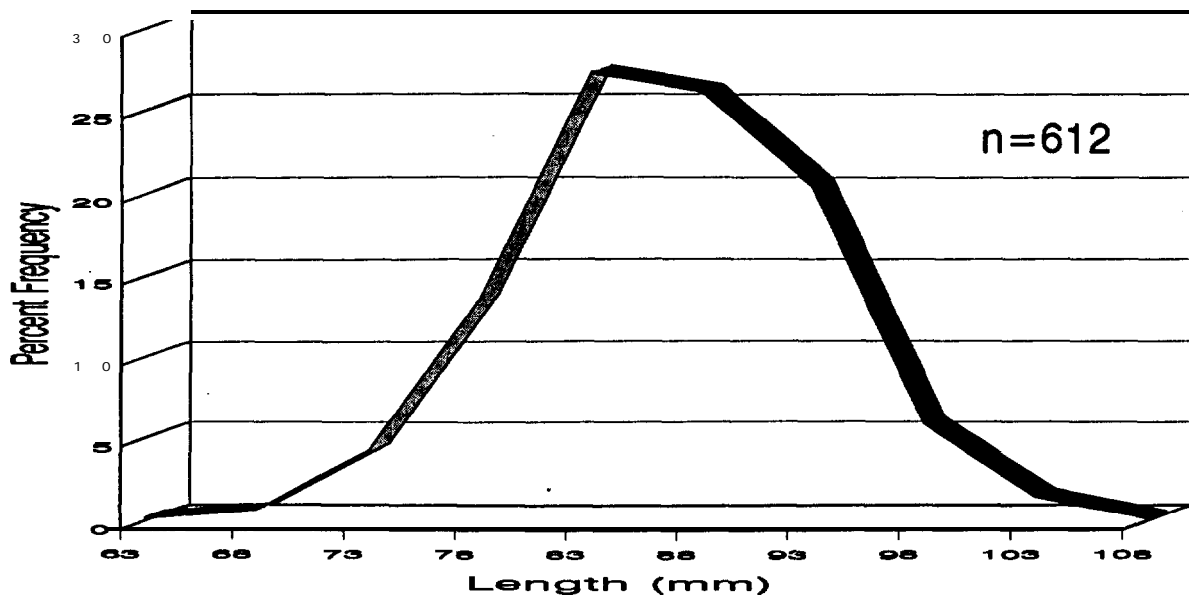


Figure 6. Length frequency distribution of juvenile fall chinook salmon released at Thornhollow Acclimation Facility on 5/31/96.

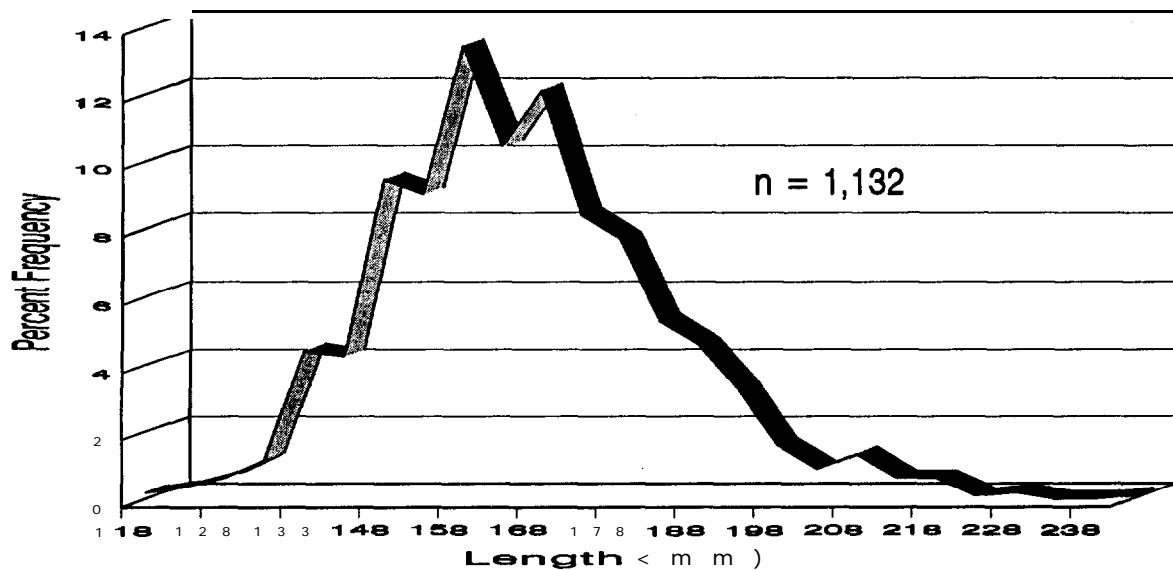


Figure 7. Length frequency distribution of juvenile spring chinook salmon released at Imeqes C-mem-ini-kern Acclimation Facility on 3/13/96.

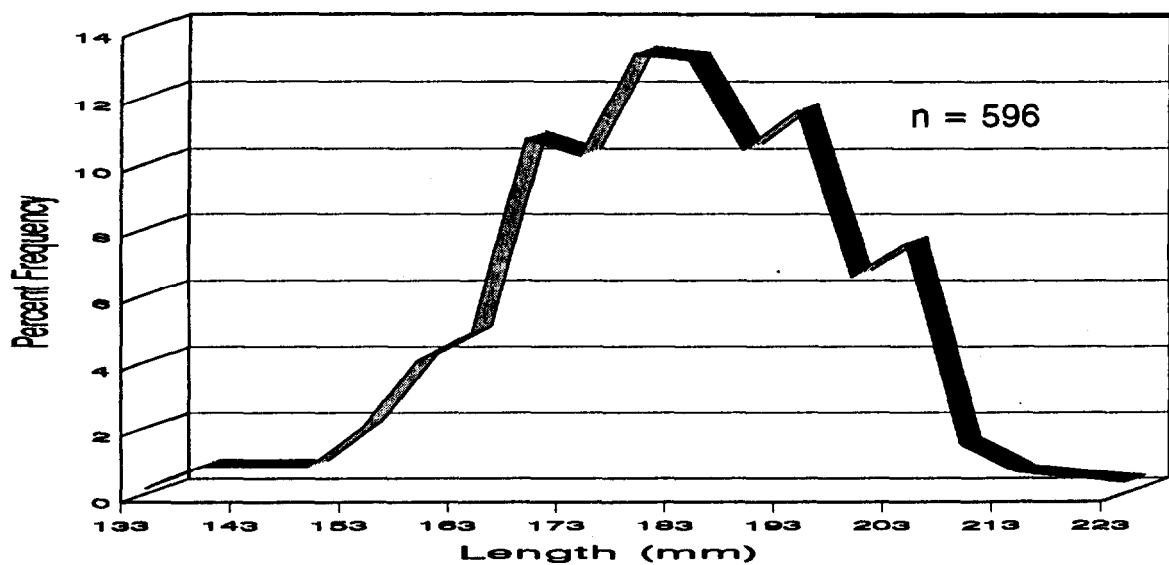


Figure 8. Length frequency distribution of juvenile fall chinook salmon released at Imeqes **C-mem-ini-kem** Acclimation Facility on 4/18/96.

The average fork length was 198 mm (Table 9). The length frequency distribution of this group is shown in Figure 9. An estimated 87.5% were partially descaled, while 6.3% were considered severely descaled (Table 9).

An estimated **2,106,815** fall chinook subyearlings at **65.1/lb.** were released from Imeqes on May 30, 1996, after being acclimated for 14 to 15 days (Table 7). This included 239,728 coded-wire tagged fish (adipose and right ventral clipped; Appendix F) and **1,867,097** right ventral clipped and blank wire tagged fish. They were fed 1.05% BWD and total mortality was 0.19% (Table 8). The mean temperature was 8.2 degrees C (Table 8). Dissolved oxygen measurements were not taken because the DO meter had to be sent in for repairs.

The average fork length was **87** mm (Table 9). The length frequency distribution of this group is shown in Figure 10. These fish were not sampled for descaling prior to release.

#### Direct Stream Releases

Three groups of juvenile **coho** salmon were released directly into the Umatilla River in 1996 (Table 7 and Appendix H). Two groups from Cascade Hatchery and one group



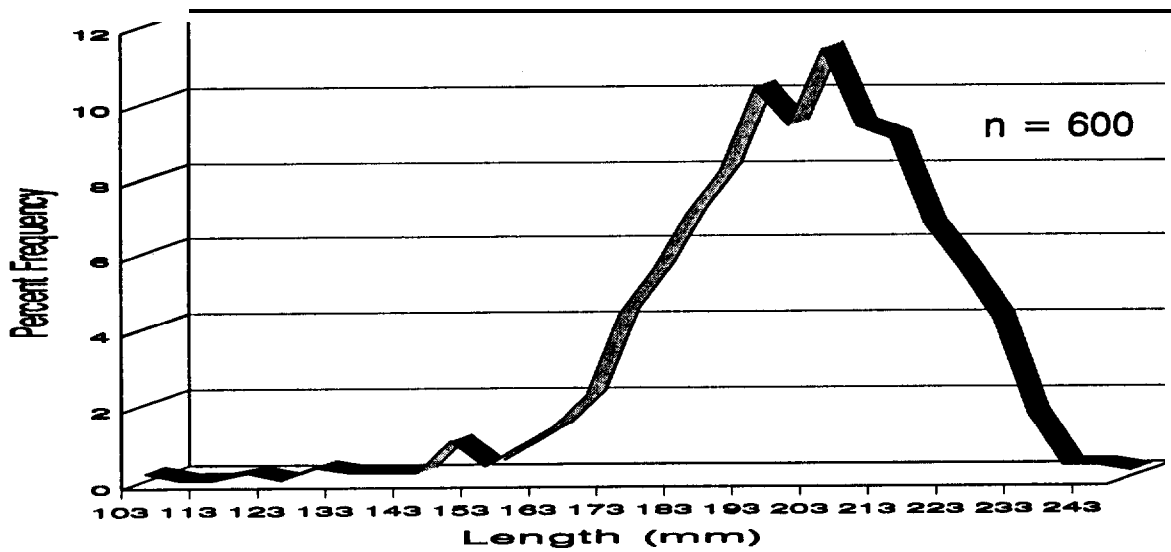


Figure 9. Length frequency distribution of juvenile fall chinook salmon released at Imeqes C-mem-ini-kem Acclimation Facility on 4/18/96.

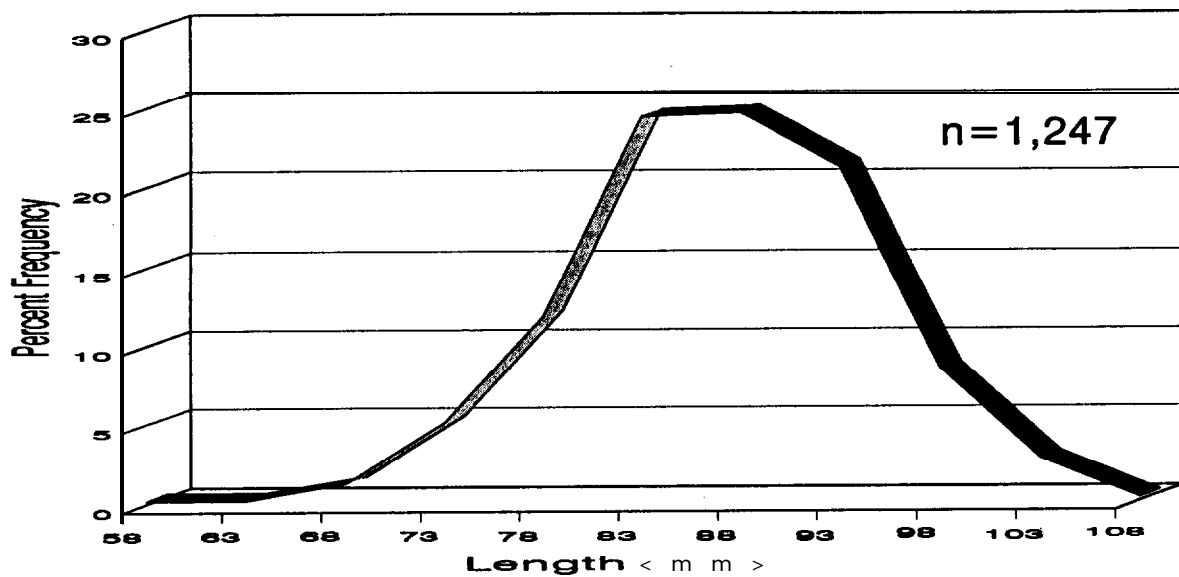


Figure 10. Length frequency distribution of juvenile fall chinook salmon released at Imeqes C-mem-ini-kern Acclimation Facility on 5/30/96.

from Lower Herman Creek Ponds were representively coded-wire tagged for stock identification.

## **Objective 2: Juvenile Outmigration Monitoring**

### **Task 2.1 and 2.2: Outmigration Data Collection and Analysis**

In 1996, high spring flows allowed the **Westland** Canal juvenile facility to operate in the bypass mode until June 9. Trapping began on June 10 and continued until the close of the trap on August 9, 1996 (Table 10). An estimated 8,715 pounds of fish, including **warm-water** and non-game species, were hauled, indicating the majority of the hatchery released juveniles migrated downstream prior to the trap being opened.

A total of 5,109 fish were sampled from June 10 to August 7, 1996 (Appendix I). An estimated **93.9%** were from subyearling fall chinook hatchery releases and 5.8% were **warm-water** and non-game species. Six hatchery rainbow trout "**legals**" (0. *mykiss*), two hatchery steelhead and five yearling **coho** were also sampled. The **coho** were unmarked but based on fish and fin condition, they were believed to be from hatchery production. One **coho** subyearling, one chinook and two summer steelhead yearlings believed to be from natural production were also sampled.

## **Objective 3: Summer Steelhead, Fall Chinook and Coho Salmon Spawning**

### **Task 3.1: Adult Collection, Holding and Spawning**

#### Collection, Holding and Spawning of Summer Steelhead

A total of 28 hatchery and 89 unmarked steelhead were collected for broodstock from September 28, 1995, through March 8, 1996. On March 15, the fish were inventoried because it was suspected that some fish may have escaped during extreme flooding in February. It was confirmed that eight wild females and 17 wild males had escaped. Sixteen additional wild steelhead were collected from March 8 to April 8 and the broodstock goals were still met. Fish were selected throughout the run to provide a representative **cross-section** of the population (Figure 11). Broodstock collected by month are listed in Appendix J.

A total of 40 females (32 wild and eight hatchery) and 44 males (31 wild and 13 hatchery) were spawned from April 2 to May 29, 1996 (Table 11 and Appendix K). Three males were used to fertilize two females in family groups 9, 10 and 15, while two males were used to fertilize one female in family group 12 (Appendix K). All other family groups had equal numbers of males and females. An estimated 215,408 green eggs were taken with a mean fecundity of 5,385.

Table 10. Estimated number of fish captured at the Westland Canal juvenile facility in 1996. /a

Date	All Species 4			Salmonids							Non-game & Warm Water Species
				Marked		Unmarked					
	Lbs.	No./lb.	Number	Fall Chinook (SY)	S T S (Y)	Coho (SY)	Coho (Y)	Chinook	Rainbow Trout	STS (Y)	
10-Jun	90	51.6	4,645	4,589	11	0	32	11	22	0	0
11-Jun	480										
12-Jun	390	57.3	22,333	22,223	0	0	0	0	0	55	55
13-Jun	420										
14-Jun	450	53.3	23,980	23,791	63	0	0	0	63	0	63
15-Jun	375										
16-Jun	320										
17-Jun	750	45.5	34,106	33,632	0	0	79	0	79	0	316
18-Jun	365										
19-Jun	150	42.8	6,420	6,341	0	0	20	0	0	0	59
20-Jun	180										
21-Jun	330	43.9	14,476	14,300	0	0	0	0	0	44	132
22-Jun	0										
23-Jun	160										
24-Jun	600	43.1	25,863	25,791	0	0	0	0	72	0	0
25-Jun	140										
26-Jun	175	39.1	6,850	6,828	0	0	0	0	0	0	22
27-Jun	250										
28-Jun	600	36.1	22,672	22,808	0	0	0	0	0	0	54
29-Jun	160										
30-Jun	100										
01-Jul	550	32.3	18,094	17,920	0	58	0	0	58	0	58
02-Jul	690										
03-Jul	150										
04-Jul	0										
05-Jul	30										
06-Jul	0										
07-Jul	0										
08-Jul	0										
09-Jul	50	23.1	1,388	1,335	0	0	0	0	0	0	53
10-Jul	0										
11-Jul	35	27.4	961	943	0	0	0	0	0	0	18
12-Jul	0										
13-Jul	0										
14-Jul	0										
15-Jul	0										
16-Jul	50	21.7	1,084	1,037	0	0	0	0	0	0	47
17-Jul	0										
18-Jul	40	16.1	644	596	0	0	0	0	0	0	46
19-Jul	0										
20-Jul	0										
21-Jul	0										
22-Jul	0										
23-Jul	45	20.4	918	883	0	0	0	0	0	0	35
24-Jul	0										
25-Jul	45	9.3	417	296	0	0	0	0	0	0	121
26-Jul	40										
27-Jul	0										
28-Jul	0										
29-Jul	50										
30-Jul	0										
31-Jul	25	12.6	320	205	0	0	0	0	0	0	115
02-Aug	30										
05-Aug	150										
07-Aug	90	14.6	1,314	177	0	0	0	0	0	0	1,137
09-Aug	100										
Total	6,715		166,665	163,677	74	58	131	11	294	99	2,341

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/a Y = yearling; SY = subyearling  
 /b includes non-game and warmwater species

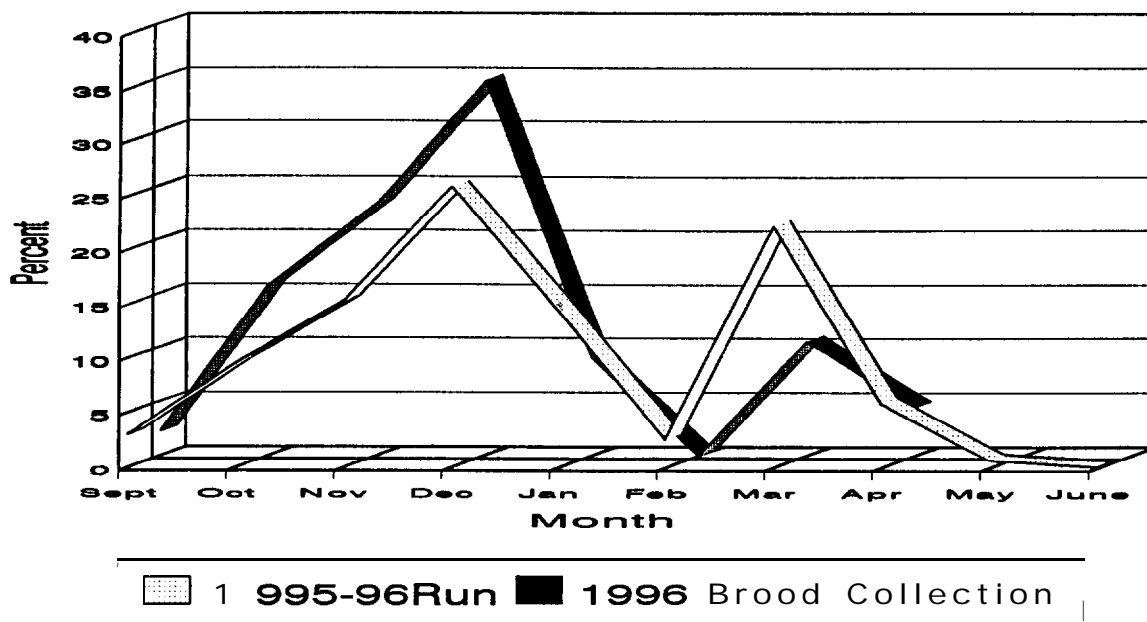


Figure 11. Return timing of summer steelhead to the Umatilla River in 1995-96 and percentage of 1996 summer steelhead broodstock collected by month.

Total prespawn mortality during the adult holding period was 15.0% (Table 11). In comparison, prespawn mortality at **Minthorn** has ranged from 7.6% to 39.0% for previous brood years. Prespawn mortality was higher for females than males (21.3 versus 9.7%).

#### Collection. Holding and Spawning of Fall Chinook Salmon

A total of 278 female and 298 male fall chinook salmon were collected for broodstock from September 25 to November 24, 1996 (Table 12). Two hundred and two females and 195 males were spawned from November 1 to November 26, 1996 and an estimated 778,028 green eggs were taken (Appendix L). The mean fecundity was 3,852.

Total prespawn mortality from natural causes was 10.6%. This included 25 males (8.4%) and 36 females (12.9%). In comparison, total prespawn mortality for fish held and spawned at **Minthorn** has ranged from 2.3 to 30.3%. An additional 11 fish (1.9%) jumped out of the pond and 20 fish (3.5%) were accidentally killed as a result of mechanical problems. The problem with fish jumping out was eliminated by lowering the water level in the pond and by installing jump out boards on top of the pond walls. The mechanical problems will be resolved prior to the 1997 spawning season.

Table 11. Summer steelhead broodstock collection, spawning and mortality in 1995-96. <sup>a</sup>

Number of females spawned and eggshken on individual spawn days																										
No. of Females Cdlected																			Total Spawned		%		Total Eggs Taken		Mortality %	
	April 2		April 10		April 17		April 26		May 1		May 8		May 15		May 22		May 29									
	No.	Eggs	No.	Eggs	No.	Eggs	No.	Eggs	No.	Eggs	No.	Eggs	No.	Eggs	No.	Eggs	No.	Eggs								
61	9	49014	2	11,510	4	25,664	6	35,088	4	22416	2	11,373	6	25441	2	11,536	5	23364	40	656	215,406	13	21.3			
No. of Males Cdlected	Number of males spawned on individual spawn days																		Total spawned		%		Mortality %		Excess Killed %	
	April 2		April 10		April 17		May 1		May 6		May 15		May 22		May 29											
	No.	Eggs	No.	Eggs	No.	Eggs	No.	Eggs	No.	Eggs	No.	Eggs	No.	Eggs	No.	Eggs										
72	9	10	2	4	6	6	10	3	6	10	3	10	3	10	5	44	61.1	7	9.7	6	a.3					
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- a/ Broodstock were collected at Three Mite Dam and held and spawned at Minthorn Acclimation Facility.  
The number of fish collected is based on data taken at Minthorn and does not coincide with the numbers reported by Trap and Haul personnel (Appendix J).  
Eight females and 17 males escaped during extreme flood conditions in February.
- b/ Does not include one male killed but not spawned
- c/ Live spawned.
- d/ Three males were live spawned.

Table 12. Fall chinook salmon broodstock collection, spawning and mortality in 1996.

No. Collected <sup>/a</sup>			No. Spawned <sup>/b</sup>				No. of Mortality <sup>/b</sup>							
Females	Males	Total	Females	%	Males	%	Total	%	Females	%	Males	%	Total	%
270	298	578	202	72.7	195	65.4	397	68.9	36	12.9	25	8.4	61	10.6

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<sup>/a</sup> Data provided by Trap and Haul personnel.<sup>/b</sup> The data in the table does not include:

Four green females, six spawned out females, one female sacrificed for CWT recovery, 11 non-CWT females released upriver and six females unaccounted for.

Four green males, five spawned out males, six males sacrificed for CWT recovery, 38 males released upriver and six males unaccounted for. Two female and nine male jumpouts and 10 female5 and 10 male5 accidentally killed by mechanical injury.

### Collection, Holding and Spawning of Coho Salmon

Coho salmon broodstock were not collected in 1996. Oregon Department of Fish and Wildlife hatcheries supplied all 1996 broodstock eggs for the Umatilla River program.

### **Task 3.2: Disease Sampling**

#### Disease Sampling of Summer Steelhead Broodstock

Cell culture assays for replicating viral agents from 83 of 84 fish spawned were negative (Table 13). One male was not sampled. Kidney samples from 72 spawned fish were taken to test for BKD and 55 tested positive. All had ELISA readings ( $OD_{405}$ ) of 0.167 or less, indicating low Rs antigen levels. Twenty-six fish were examined for whirling disease and all samples were negative.

Fifteen mortalities were sampled (Table 13). Spores of *C. shasta* were detected in seven fish. Levels were considered to be low in four fish, moderate in one fish and high in two fish. Thirteen tested positive for BKD. These all had  $OD_{405}$  readings of 0.104 or less, indicating low antigen levels. Aeromonad-pseudomonad bacteria were cultured from the kidneys of five fish and enteric redmouth disease (*Yersinia ruckeri*) was detected in six fish.

#### Disease Sampling of Fall Chinook Salmon Broodstock

The reproductive fluid from 139 spawned females and pyloric caeca, kidney and spleen tissue samples from an additional 60 spawned females were sampled for replicating viral agents. All samples were negative (Table 13). Kidney samples from 139 spawned females were taken to test for BKD. One fish had an ELISA reading of 2.297. This would be considered to be a clinical level. One fish had a moderate level (0.326) and the remaining fish had ELISA readings of 0.088 or less, indicating negative or low Rs antigen levels.

Table 13. Results of disease sampling of Umatilla River summer steelhead, fall chinook and coho salmon broodstock in 1996. /a

Species	Test	Incidence	Comments
<u>Summer Steelhead</u>			
Spawned Fish	Culturable *uses	0/83	
	Bacterial kidney disease ( <i>Renibacterium salmoninarum</i> )	55/72	All had ELISA (OD405) readings of 0.167 or less, indicating low Rs antigen levels.
Mortalities	Whirling disease ( <i>Myxobolus cerebralis</i> )	0/26	
	<i>Ceratomyxa shasta</i>	7/15	Four had low levels of infection, one had a moderate level of infection and two had high levels of infection
	Bacterial kidney disease	13/15	All had ELISA (OD405) readings of 0.104 or less, indicating low Rs antigen levels.
	aeromonad-pseudomonad bacteria	5/15	Cultured from the kidney
	Enteric redmouth disease ( <i>Yersinia ruckeri</i> )	6/15	
	Other culturable bacteria	0/15	No other culturable bacteria detected
<u>Fall Chinook</u>			
Spawned Fish	Culturable *uses	0/139	
	Bacterial kidney disease	41/139	One fish had a high OD405 reading (2.297), indicating a clinical level of Rs antigens. One fish had a reading of 0.326, indicating a low to moderate level of Rs antigens and 39 fish had readings of 0.088 or less, indicating negative or low Rs antigen levels.
Mortalities	Bacterial kidney disease	14/28	All had OD405 readings of 0.084 or less, indicating negative or low Rs antigen levels.
	<i>Ceratomyxa shasta</i>	0/4	
	aeromonad-pseudomonad bacteria	8/28	Cultured from the kidney
	Furunculosis <i>Aeromonas salmonicida</i>	16/28	Cultured from the kidney
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/a Data provided by ODFW Eastern Oregon Fish Pathology Laboratory.

Twenty-eight mortalities were sampled (Table 13). All were tested for BKD and all had OD, readings of 0.081 or less, indicating low or negative antigen levels. *Aeromonad-pseudomonad* bacteria were cultured from the kidneys of eight fish and *furunculosis* (*Aeromonas salmonicida*) was detected in 16 fish. Four fish were examined for spores of *C. shasta* and none were detected.

## Disease Sampling of Coho Salmon Broodstock

Coho salmon broodstock were not collected in 1996. Oregon Department of Fish and Wildlife hatcheries supplied all 1996 broodstock eggs for the Umatilla River program.

### **Objective 4: Adult Survival and Contributions**

#### **Task 4.1: Snout and Data Collection**

Snouts from 71 summer steelhead were collected at Three Mile Dam in **1995-96** and 25 snouts were collected from broodstock held at Minthorn. Snouts were collected from 42 spring chinook salmon at Three Mile Dam and 175 spring chinook during spawning ground and creel surveys. Snouts were collected from 162 fall chinook and 17 **coho** salmon at Three Mile Dam and one snout was collected from a **coho** salmon sampled during spawning ground surveys above Three Mile Dam.

Snouts were collected at Three Mile Dam by Trap and Haul personnel, on spawning ground surveys by CTUIR Natural Production Monitoring and Evaluation personnel, and on creel surveys by other CTUIR and ODFW personnel. Snouts were delivered to ODFW in Clackamas, Oregon for code identification.

#### **Task 4.2: Coded-Wire Tag Data Analysis**

### Adult Survival and Umatilla River Returns

#### Summer Steelhead

Since 1975, all Umatilla River summer steelhead releases have been from Umatilla River broodstock. Coded-wire tagged groups have been released every year since 1988 at or near Bonifer and **Minthorn** (Table 14). In 1992, coded-wire tagged releases also occurred at the mouth of Meacham Creek. All coded-wire tagged releases have been made in March, April and May with fish ranging in size from 4.5 to **8.7/lb.** In addition, two groups of **non**-tagged fish were released in 1988 and small numbers of non-tagged fish have been released in some years as part of ODFW juvenile passage evaluation studies.

Total estimated recovery of adults from individual releases made from 1988 to 1994 has ranged from less than 0.01% for a group released in 1992 to 0.97% for a group released in 1990 (Table 14). Escapement to the Umatilla River has ranged from 0.00 to 0.72% for other groups released in the same years (Appendix M).

Acclimation evaluation studies were conducted at Bonifer and **Minthorn** from 1988 to 1991. Results from these studies have been discussed previously (**Rowan** 1996) and are not discussed here, except to say that the results from the studies were inconclusive.



Tabk 14. Liberation and survival information for summer steelhead released in the Umatilla River Basin.

Brood Year	Number of Juveniles Released	Size at Release	Release Location	Date of Release	Number of Adults Recovered	% Survival
87	30,549	7.4	Minthorn	April 88	212	0.69
87	30,757	6.5	Nr. Minthorn	April 88	162	0.53
87	33,984 /a	10.3	Umatilla RM 23	May 88	NA	NA
88	10,033 /a	57.5	Umatilla RM 89	Dec 88	NA	NA
88	29,852	6.6	Minthorn	May 89	20	0.04
88	22274 lb	5.5	Bonifer	Apr - May 89		
88	29,586	5.6	Nr. Minthorn	May 89	21	0.07
89	30,225	5.9	Bonifer	May 90	553	0.93
89	29,522 /c	7.7	Bonifer	May 90		
89	29,446	5.5	Nr. Bonifer	May 90	287	0.97
90	30,221	6.2	Bonifer	May 91	373	0.88
90	12,389 /c	7.5	Bonifer	May 91		
90	29,325	8.7	Nr. Bonifer	May 91	242	0.83
90	3,998 /a	12.5	Umatilla RM 3	April 91	NA	NA
91	67,435	5.8	Bonifer & Minthorn	Mar 92	136	0.20
91	64,550	5.0	Mouth of Meacham cr.	April 92	13	0.02
91	67,419	5.5	Mouth of Meacham Cr.	Apr-May 92	6	<0.01
91	5,433 A	5.8	Umatilla RM 3	April 92	NA	NA
92	44,824	4.5	Bonifer	April 93	284	0.63
92	47,979	5.6	Minthorn	April 93	285	0.59
92	65,465	6.1	Bonifer	May 93	52	0.08
93	49,598	5.1	Minthorn	April 94	173	0.35
93	51,403	4.9	Bonifer	April 94	179	0.35
93	52,097	5.2	Bonifer	May 94	12	0.02
93	1,732 /a	5.7	Umatilla RM 27.3	April 94	NA	NA

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/a These fish were adipose clipped only and were not included with the coded-wire tagged fish to estimate total adults recovered.

/b These fish were adipose clipped only but were included with the coded-wire tagged fish acclimated at Minthorn to estimate total adults recovered.

/c These fish were adipose clipped only but were acclimated with the coded-wire tagged fish and were included to estimate total adults recovered.

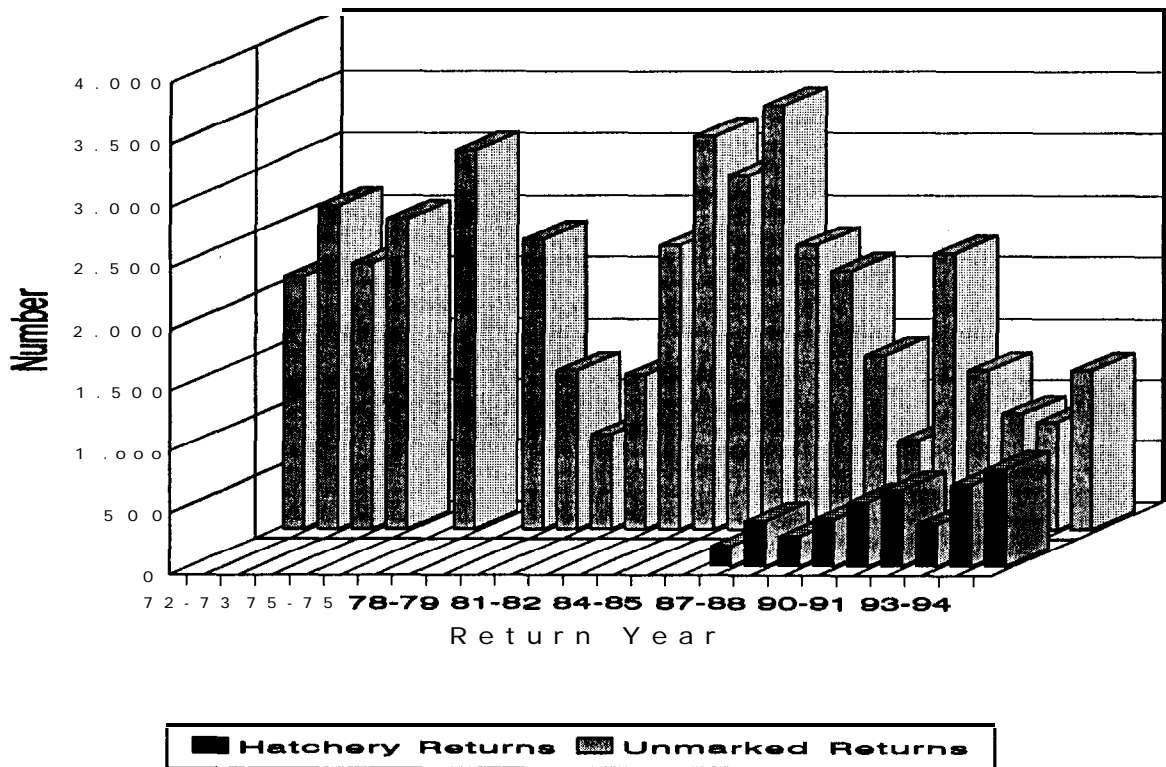


Figure 12. Returns of wild and hatchery summer steelhead to Three Mile Dam on the Umatilla River, 1972-1996 (Return numbers from the fall of 1972 to the spring of 1987 are estimates, while return numbers beginning in the fall of 1987 are from actual counts).

An estimated 75.0% of the adults recovered from all releases have been captured at Three Mile Dam on the Umatilla River and 15.0% have been recovered in the Columbia River **gillnet** fishery (Appendix M). An estimated 9.8% have been recovered in the Columbia River sport fishery.

#### Adult Returns to Minthorn

A total of 785 hatchery summer steelhead returned to Three Mile Dam on the Umatilla River in 1995-96 (Figure 12) and 681 were released upriver. Seven hatchery fish were trapped at **Minthorn** and several other fish were observed in Minthorn Springs Creek below the ladder. Five of the trapped fish were coded-wire tagged and were sacrificed for snout and data recovery. The other two fish were adipose clipped only and were released back into **Minthorn** Springs Creek.

### Adult Returns to Bonifer

One summer steelhead was observed in the ladder at Bonifer and several fish were observed at the confluence of Meacham Creek and Boston Canyon Creek. It is unknown whether these fish were marked or unmarked.

### Fall Chinook - **Spring** Creek Tule Stock

Releases in 1982 of fall chinook salmon in the Umatilla River were subyearlings from Spring Creek Tule stock. Estimated survival rates from these releases have been discussed previously (**Rowan** 1996) and are not discussed in this report.

### Fall Chinook - Bonneville and Umatilla Upriver Bright (URB) Stock

All but one release of yearling fall chinook salmon in the Umatilla River has been from Bonneville URB stock. Releases have been made in the upper Umatilla River (RM 56 to RM 87) and in Meacham Creek (RM 2 and RM 30) (Table 15). All releases have been made in March and April and fish have ranged in size from 5.0 to 10.4/lb.. One release of yearling fish from Priest Rapids URB stock was made in 1996.

The estimated total survival rates (through age-7) from individual releases made from 1983 to 1988 (1981 to 1986 brood years) have ranged from 0.08 to 3.30% (Table 15). Survival rates to the Umatilla River have ranged from 0.00 to 0.90% (Appendix N). Yearling releases made from 1989 through 1991 were not representively coded-wire tagged. Recovery data for the 1992 through 1996 releases (1990 to 1994 brood years) are incomplete. Preliminary survival rates have ranged from 0.02 to 0.25%. Survival rates to the Umatilla River have ranged from less than 0.01 to 0.20% (Appendix N).

Total exploitation of Bonneville URB stock yearlings (through 1986 brood) is 84.7%. Individual exploitation rates for ocean commercial and Columbia River **gillnet** catches are 48.3 and 36.7% respectively. Sport and treaty exploitation rates are 12.7 and 2.3%.

Spring releases of subyearling fall chinook from Bonneville URB stock have been made from 1984 through 1993, excluding 1987 and 1989 (Table 15). Subyearlings from Umatilla River broodstock were also released in 1992 and 1993.

Prior to 1990, all spring subyearling releases were made near the mouth of the river because of potential for fish loss due to unscreened or partially screened irrigation diversions (Table 15). All groups were released in June. Fish ranged in size from 85.1 to 93.1/lb..

The estimated total survival rates (through age-7) from spring subyearling releases in 1984, 1985 and 1986 (1983 through 1985 brood years) were 0.79, 0.87 and 0.51%,

Tabb 15. **Liberation and survival informatbn for fall chinook salmon (Bonneville URB and Umatilla River stock) released in the Umatilla River Basin (1983–1996).**

Brood Year/Stock/a	Number of Juveniles Released	Size at Release	Release Location	Date of Release	Number of Adults Recovered	% Survival
81 B	100,564	5.9	Bonifer & Meacham Cr.	Mar 83	169	6.17
82 B	226,412	6.6	Bonifer & Meacham Cr.	Mar 84	178	0.08
83 B	963,250	85.1	Umatilla RM 1.5	June 84	7,599	0.79
03 B	198,162	7.8	Umatilla RM 87 & Bonifer	Mar 85	1,593	0.80
04 B	3223,172	92.3	Umatilla RM 1.5	June 85	28,170	0.07
84 B	51,000	16.2	Bonifer	Oct 85	344	0.67
84 B	91,036	5.0	Minthom	Mar 86	6,663	3.22
04 B	115,779 /b	4.7	Bonifer	Mar 86		
85 B	2,029,602	06.0	Umatilla RM 1.5	June 86	10,281	0.51
85 B	35,574 /c	11.6	Minthom	oct 86	NA	NA
85 B	109,143	8.1	Minthom	Mar 87	2,469	2.26
85 B	102,363	6.6	Bonifer	Mar 87	2,497	2.44
86 B	100,791	6.6	Minthom	Mar 88	3,325	3.30
86 B	99,550	to.2	Bonifer	Mar 88	2,526	2.54
87 B	1,429,250 /c	93.1	Umatilla RM Q	June 88	NA	NA
87 B	217,443 /c	8.6	Umatilla RM 63 & 73.5	Mar 89	NA	NA
88 B	255,614 /c	6.2	Umatilla RM 70	Mar 90	NA	NA
89 B	2,425,661	67.5	Umatilla AM 70 & 79	May-June 90	4,625	0.19
89 B	71,063	9.2	Minthom	Oct 90	48	0.07
89 B	76,646	8.8	Nr. Minthom	Oct 90	30	0.04
89 B	194,847 /c	7.8	Umatilla RM 56 & 79	Mar 91	NA	NA
QO B	3,091,214	73-03	Umatilla AM 70 & 79	May 91	6,065	0.20
QO B	10,462 /c	80–194	Umatilla RM 3	April-May 91	NA	NA
90 B	79,672	80.5	Minthom	May 91	201	0.25
Qo B	74,865	86.0	Nr. Minthom	May 91	126	0.17
90 B	220,440	7.6	Umatilla RM 56 & 70	Mar 92	43	0.02
QI B	2,678,343	55.2-70.6	Umatilla RM 42.5	May 92	35	<0.01
91 B	2,670 /c	112	Umatilla RM 3	April-May 92	NA	NA
91 U	504,369 /c	53.4	Umatilla RM 42.5	May 92	NA	NA
QI U	5,167 /c	62.8	Umatilla RM 3	May 92	NA	NA
91 B	134,637	9.1	Umatilla RM 73.5	Mar 93	57	0.04

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Table 15. (cont.)

Brood Year/Stock	la	Number of Juveniles Released	Size at Release	Release Location	Date of Release	Number of Adults Recovered	% Survival
9 2	B & U	2,629,917	59.3–68.0	Umatilla RM 73.5	May 93	930	0.04
9 2	B & U	29,661 /c	95.5–142	Umatilla RM 0 to 27.3	Mar–May 93	NA	NA
92	B	233,629	10.4	Umatilla RM 73.5	Mar 94	591	0.25
92	B	49,624	6.5	Umatilla RM 73.5	Apr 94	40	0.06
93	B	227,066	6.0	Thomhdlow (RM 73.5)	April 95	362	0.16
94	B	217,294	7.0	Imeques (RM 80)	April 96	137	0.06
94	B	204,022	7.1	Thomhdlow (RM 73.5)	April 96	350	0.17

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/a B = Bonneville URB stock; U = Umatilla River stock

/b These fish were not coded-wire tagged but were included with the coded-wire tagged fish released from Minthorn to estimate total adults recovered.

/c These fish were not coded-wire tagged

respectively (Table 15). Releases made in 1988 were not representatively coded-wire tagged. Survival rates to the Umatilla River have ranged from 0.00 to 0.001% (Appendix 0).

Beginning in 1990, all spring subyearling releases have been in the upper Umatilla River (RM 42.5 to RM 79), other than small numbers of non-tagged fish released between RM 0 and 27.3 as part of ODFW juvenile passage evaluation studies (Table 15). An acclimation evaluation experiment was conducted in 1991. One group of fish was acclimated and released at Minthorn and a control group was released concurrently. In addition, one production group of non-tagged fish was released in 1992. All releases have been made in May and June with fish ranging in size from 53.4 to 87.5/lb..

Recovery data for the 1990 through 1993 direct stream releases (1989 through 1992 brood years) are incomplete. Preliminary survival rates range from less than 0.01% for releases made in 1992 to 0.20% for releases made in 1991 (Table 15). Survival rates to the Umatilla River range from 0.001 to 0.026% for the same releases (Appendix 0).

Recovery data for the acclimation study is also incomplete. The preliminary survival rate from the acclimated group (0.25%) is higher than from the control group (0.17%). Umatilla River recoveries are 0.028 and 0.023%, respectively (Appendix 0).

Estimated total exploitation of spring subyearling releases (through 1990 brood) is 79.7%. Individual exploitation rates for ocean commercial and Columbia River gillnet catches are 43.1 and 51.9% respectively. Sport and treaty exploitation rates are 4.4 and 0.6%.

Subyearling fall releases from **Bonneville** URB stock have been made in 1985, 1986 and 1990. All releases occurred in October at either Bonifer or **Minthorn** acclimation facilities (Table 15). One acclimation evaluation experiment was conducted at **Minthorn** in 1990. Fish ranged in size from 8.8 to **16.2/lb.**

The estimated total survival rate (through age-7) from the 1985 subyearling fall release (1984 brood year) was 0.67% (Table 15). Survival rate to the Umatilla River was 0.006% (Appendix O). Releases made in 1986 were not representatively coded-wire tagged.

Recovery data for the 1990 acclimation evaluation releases are incomplete. Preliminary survival rates for the acclimated and non-acclimated groups are 0.07 and **0.04%**, respectively. Survival rates to the Umatilla River are 0.01 and 0.001%.

Total exploitation of the subyearling fall releases (1984 and 1989 brood years) is 91.9%. Individual exploitation rates for ocean commercial and Columbia River **gillnet** catches are 43.7 and **52.4%**, respectively. Sport and treaty exploitation rates are 3.1 and 0.8%.

Survivals (through age-7 fish) of the 1984, 1985 and 1986 subyearling spring releases (1983 through 1985 brood years) and the 1985 subyearling fall release (1984 brood year) were 0.79, 0.87 and **0.51%**, respectively (Table 15). In comparison, survival of the same brood years released as yearlings in 1985, 1986 and 1987, were 0.80, 3.22 and **2.35%**, respectively. Although the survival rates of the 1983 brood subyearling and yearling releases are similar, data from the 1984 and 1985 brood and preliminary data from subsequent brood years suggest that yearlings survive at a higher rate than either spring or fall subyearling releases.

#### **Fall Chinook - Priest Rapids and Umatilla URB Stock**

Releases of Priest Rapids URB stock have been made from 1987 to 1990 and in 1995 and 1996. A combination of Priest Rapids and Umatilla River URB stock were released in 1994 (Table 16). From 1987 through 1995, fish were released as subyearlings from spring through fall. Subyearling spring releases made from 1987 through 1989 all occurred in May in the lower Umatilla River. Releases in 1990, 1994 and 1995 were made in the upper Umatilla River. Fish ranged in size from 60.4 to **82.4/lb.**

The estimated total survival rates (through age-7) for the 1987, 1988 and 1989 spring releases (1986 through 1988 brood years) are **0.82, 0.07 and 0.12%**, respectively (Table 16). Survival rates to the Umatilla River are 0.017, 0.008 and 0.008% (Appendix P). Releases in 1990 were not representatively coded-wire tagged. Recoveries for the 1994 and 1995 releases include age-2 and age-3 fish only and are not discussed in this report.

Total estimated exploitation of the subyearling spring releases (1986 through 1988 brood years) is 83.0%. Individual exploitation rates for ocean commercial and Columbia

Table 16. Liberation and survival information for fall chinook salmon (Priest Rapids URB and Umatilla River stock) released in the Umatilla River Basin (1987-1996).

Brood Year/Stock la	Number of Juveniles Released	Size at Release	Release Location	Date of Release	Number of Adults Recovered	% Survival
86 P	1,476,830	60.4	Umatilla RM 9	May 87	12,064	0.82
86 P	2,000	20.0	Minthorn	July 87	5	0.25
87 P	1,886,757	68.3	Umatilla RM 23	May 88	1,399	0.07
a7 P	14,408	9.8	Minthorn	Nov 88	62	0.43
87 P	79,681	8.6	Nr. Minthorn	Nov 88	409	0.51
88 P	2,393,710	66.6	Umatilla RM 23	May 89	2,890	0.12
88 P	78,825	10.9	Minthorn	Oct 89	79	0.10
88 P	78,132	11.1	Nr. Minthorn	Oct 89	67	0.09
89 P	629,800 /b	82.4	Umatilla RM 70 & 79	May 90	NA	NA
93 P&U	2,843,212	59.1 – 72.4	Umatilla RM 73.5	May 94	542	0.02
93 P&U	22,174 lb	85-171	Umatilla RM 27.3 to 32.5	April-May 94	NA	NA
94 P	561,423	64.7	Thornhollow (RM 73.5)	May 95	0	0.00
94 P	1,904,875	63.1	Imeques (RM 80)	May 95	0	0.00
94 P	143,087	5.1	Imeques (RM 80)	April 96	32	0.02
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/a P = Priest Rapids stock; U = Umatilla River stock

/b These fish were not coded-wire tagged.

River gillnet catches are 52.4 and 40.4%, respectively. Sport and treaty exploitation rates are 6.4 and 0.8%.

One group of subyearling fish was acclimated at Minthorn and released in July, 1987 (Table 16). Due to low dissolved oxygen levels and pump failure (Lofy et al. 1988), very few juveniles were released and total recovery is estimated to be five adults.

Acclimation evaluation studies were conducted at Minthorn in the fall of 1988 and 1989. Results from these studies have been discussed previously (Rowan 1996) and are not included in this report.

Total estimated exploitation of the subyearling fall releases (1987 and 1988 brood years) is 77.5%. Individual exploitation rates for ocean commercial and Columbia River gillnet catches are 49.6 and 33.1%, respectively. Sport and treaty exploitation rates are 14.6 and 2.7%.

The total estimated exploitation rate of Priest Rapids URB subyearling spring releases (83.0%) is similar to the exploitation rate of Bonneville URB subyearling spring releases (79.7%).

Releases in 1996 from Priest Rapids stock were yearling fish. Recoveries include age-2 fish only and are not discussed in this report.

### Fall Chinook - Straying

Returning adults from juvenile URB stock fall chinook salmon releases in the Umatilla River have strayed above McNary Dam to Columbia and Snake River terminal locations (hatcheries, fish traps and spawning grounds). It is believed that straying is partially the result of low attraction flow at the mouth of the Umatilla River during the adult return season and, in the case of subyearling spring releases made from 1982 through 1989, lack of imprinting because they were released in the lower river (below RM 23).

Stray levels appear to be affected by age at release. When comparing estimated adult recoveries from the Umatilla River with recoveries above McNary Dam, the data indicate that releases of subyearlings have resulted in higher levels of adult straying than releases of yearling fish. Adult recoveries above McNary Dam have been the highest from subyearling spring releases (Bonneville, Priest Rapids and Umatilla River URB stock) made from 1984 through 1993. An estimated 81.9% of the terminal recoveries from those releases have been from terminal locations above McNary Dam (Table 17). Adult recoveries above McNary Dam from subyearling fall releases (Bonneville and Priest Rapids URB stock) made from 1985 through 1990 has averaged 58.2%. Adult recoveries above McNary Dam from yearling releases (Bonneville URB stock) made from 1983 through 1994 have been the lowest and has averaged 35.7%.

Release location (upper versus lower river) also appears to affect stray levels. Prior to 1990, all subyearling spring releases were made in the lower Umatilla River. An estimated 7.0% of the terminal recoveries from those releases have been from the Umatilla River (Table 17). In comparison, Umatilla recoveries from the 1990 through 1993 subyearling spring releases made in the upper Umatilla River are 35.0%. This would suggest that releases made into the upper Umatilla River increase homing.

An estimated 69.9% of all adult strays recovered above McNary Dam from Umatilla River juvenile fall chinook releases made from 1983 through 1994, have been recovered from Columbia River terminal locations (Table 17). An estimated 30.1% have been recovered from Snake River terminal locations.



Table 17. Straying of adult fall chinook salmon from juvenile releases in the Umatilla River (1982-1994). /1

Estimated Adult Survival																				
Rood Year	Number Released	Date of Release	Size at Release	Release Location	Washington															
					Umatilla River		Washington R		Lyons Ferry Hatchery		Snake River /3		Priest Rapids /4		Hanford Reach		Wells Dam Hatchery		Yakima River	
					No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
<u>Subyearling spring releases (Tule stock)</u>																				
61	978,336	Apr 82	79.0	Uma. RM 1.5 & 51.5	0	0.0	0	0.0												
61	2,628,635	Apr 82	92.0	Umatilla RM 1.5	0	0.0	111	100.0	83	75			28	25						
	3,807,171				0	0.0	111	100.0	83	75			28	25						
<u>Subyearling spring releases (Bonneville URB stock)</u>																				
63	988,250	June 84	85.1	Umatilla RM 1.5	0	0.0	1,648	100.0	133	8			60	4	1,458	88				
84	3,223,172	June 85	92.3	Umatilla RM 1.5	47	2.0	2,260	98.0	125	6			62	3	2,073	92				
85	2,029,602	June 86	86.0	Umatilla RM 1.5	0	0.0	2,116	100.0	417	20			138	6	1,562	74				
69	2,425,681	May-Jun 90	67.5	Umatilla RM 70 & 79	412	28.1	1,053	71.9	92	9	456	43			366	35			137	13
90	3,091,214	May 91	81.8	Umatilla RM 70 & 79	1,006	28.6	2,511	71.4	70	3	665	26	96	4	210	8			1,470	59
90	756,72	May 91	80.5	Mhhom	23	25.8	66	74.2	2	3	20	30							44	67
90	74,666	May 91	86.0	Nr. Mhhom	17	40.5	25	59.5	1	4	16	64	5	20	1	4			2	6
91	2,678,343	May 92	55.2-70.6	Umatilla RM 2.5	35	100.0	0	0.0	-	-									-	-
	14,568,799				1,540	137	9,679	86.3	640	9	1,159	12	359	4	5,668	59			1,853	17
<u>Subyearling spring releases (Bonneville URB and Umatilla River stock)</u>																				
92	2,629,917	May 93	62.7	Umatilla RM 73.5	544	61.3	125		9	7	62	50	45	36	9	7				
<u>Subyearling spring releases (Priest Rapids URB stock)</u>																				
86	1,476,830	May 87	60.4	Umatilla RM 1.5	244	14.7	1,415	85.3	622	44	07	7	342	24	317	22	12	1	24	2
86	2,000	July 87	20.0	Mhhom	0	0.0	1	100.0	1	100										
87	1,886,757	May 88	68.3	Umatilla RM 23	143	46.9	162	53.1	67	41	67	41	19	12					10	6
88	2,393,710	May 89	66.6	Umatilla RM 23	186	23.0	621	77.0	140	23	279	4	5	124	20				78	13
	5,759,297				573	20.7	2,199	78.3	830	38	443	20	485	22	317	14	12	1	112	5
<u>Subyearling fall releases (Bonneville URB stock)</u>																				
84	51,000	Oct 85	16.2	Bonifer	3	15.0	17	85.0	17	100										
89	71,663	Oct 90	9.2	Mhhom	8	80.0	2	20.0			1	50							1	50
89	76,646	Oct 90	8.8	Nr. Mhhom	1	0	4	80.0			4	100								
	199,509				12	34.3	23	65.7	17	74	5	22							1	4

Table 17. (cont.)

Brood Year	Number Released	Date of Release	Size at Release	Release Location	Estimated Adult Survival													
					Washington										Wells Dam Hatchery			
					Umatilla River		Washington /2		Lyons Ferry Hatchery		Snake River /3		Priest Rapids A		Henford Reach		No.	%
					No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
<u>Subyearling fall releases (Priest Rapids URB stock)</u>																		
87	14,408	Nov 88	9.8	Minthorn	2	3.4	57	98.6	10	18	38	67	10	18				
87	78,681	Nov 88	8.8	Nr. Minthorn	53	67.1	26	32.9	8	31	13	50	1	4			4	15
88	78,825	Oct 89	10.9	Minthorn	18	58.3	11	40.7	4	36	7	64						
88	74,132	Oct 89	11.1	Nr. Minthorn	9	450	11	55.0	3	27	7	8	4	1	9			
	251,046				80	432	105	56.8	25	24	65	62	12	11			4	4
<u>Yearling spring releases (Bonneville URB stock)</u>																		
81	100,584	April 83	5.9	Bonifer & Meacham Cr.	0	0.0	2	100.0	2	100								
82	228,412	April 84	8.6	Bonifer & Meacham Cr.	0	0.0	7	103.0	7	100								
83	198,162	Mar 85	7.8	Uma. RM 87 & Bonifer	2	3.6	54	96.4	54	100								
84	206,815	Mar 86	5.0	Bonifer & Minthorn	129	351	239	64.9	105	44			2	1	131	55		
85	109,143	Mar 87	8.1	Minthorn	220	653	117	347	18	15	2	2	4	3	92	79		
85	102,363	Mar 87	8.6	Bonifer	128	63.7	73	36.3	67	82	6	8						
86	100,791	Mar 88	8.8	Minthorn	291	77.8	83	222	20	24	39	47			24	29		
86	98,550	Mar 88	10.2	Bonifer	218	81.2	50	18.8	13	26	36	72	1	2				
90	220,440	Mar 82	7.7	Uma. RM 56-70	4	100.0	0	0.0										
01	134,837	Mar 93	9.1	Uma. RM 73.5	14	70.0	8	30.0	3	50	3	50						
92	233,629	Mar 94	10.4	Uma. RM 73.5	148	93.7	10	6.3	10	100								
92	48,824	April 94	8.5	Uma. RM 73.5	8	75.0	2	25.0							2	100		
	1,784,530				1,158	64.3	643	35.7	289	47	86	13	7	1	248	39		

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/1 Subjects are not included.

/2 Estimated Washington recoveries above McNary Dam.

/3 Estimated recoveries from Snake and Tucannon River spawning ground surveys and fish traps.

/4 Estimated recoveries from Priest Rapids spawning channel and fish trap.

Beginning in 1990, all production releases of fall chinook salmon juveniles have been in the upper Umatilla River (RM 42.5 to RM 80) and all future releases will be in the upper river. Since 1995, all fall chinook have been acclimated at either Thornhollow or Imeques acclimation facilities prior to release. Additional facilities are proposed for the Umatilla River basin which will ensure that all juvenile salmon will be acclimated in the future. Fall chinook salmon from Umatilla River broodstock were included from 1992 through 1994. Permanent adult fall chinook broodstock holding and spawning facilities, capable of meeting full Umatilla River production goals, were completed at Three Mile Dam on the Umatilla River in 1996. All fall chinook juvenile releases in the Umatilla River will eventually be progeny of Umatilla River broodstock. The Umatilla Basin Project will help provide better attraction and fish passage flows in the Umatilla River. Phase I of the project is currently in operation and exchanges Columbia River water for water which is currently being taken directly from the Umatilla River for irrigation and provides flow from Three Mile Dam to the mouth of the river during the adult return season. Phase II, scheduled for completion in 1997, will be an exchange of Columbia River water for natural stream flow and McKay Reservoir storage water and will increase flow in the lower Umatilla River (below McKay Creek confluence) during the adult return and juvenile outmigration seasons.

### Spring Chinook

Beginning in 1988, spring chinook from Carson stock have been released in the Umatilla River as yearlings and subyearlings in the spring and fall. Juveniles from Umatilla River broodstock were also released in the fall of 1991.

Yearling releases have been made in the mainstem Umatilla River from RM 23 to RM 89 and in Meacham Creek at RM 2 (Table 18). In addition, a small number have been released at Three Mile Dam as part of ODFW passage evaluation studies. Coded-wire tagged groups have been released every year and non-tagged production groups have also been released in 1988 and 1990. Releases have occurred from March through May and fish have ranged in size from 7.9 to 20.6/lb..

The estimated total survival rates (through age-6) from individual releases made from 1988 through 1991 (1986 through 1989 brood years) have ranged from 0.18% for a group released in 1991 to 0.95% for a group released in 1988 (Table 18). Survival rates to the Umatilla River have ranged from 0.16 to 0.77% for the same releases (Appendix Q). Recovery data for the 1992 through 1994 releases are incomplete. Preliminary survival rates range from 0.00% for groups of fish released in both 1992 and 1993 to 0.52% for a group released in 1994. Survival rates to the Umatilla River also range from 0.00 to 0.52% for the same releases. An estimated 83.4% of all recoveries are from the Umatilla River, 14.5% are from Columbia River fisheries and 2.1% are from terminal areas outside the Umatilla River. Recoveries for the 1995 release are not discussed in this report.

Table 18. Liberation and survival information for spring chinook salmon released in the Umatilla River Basin.

Brood Year	Number of Juveniles Released	Size at Release	Release Location	Date of Release	Number of Adults Recovered	% Survival
88	99,895 <i>la</i>	20.8	Umatilla RM 23	Apr 08	NA	NA
88	108,231	10.1	Bonifer	Mar-Apr 88	1,008	0.95
88	101,870	8.8	Umatilla RM 23 & Nr. Bonifer	Apr 88	1,311	0.89
86	09,288 <i>/b</i>	10.3	Upper Umatilla River	Apr 88		
87	1,198	21.4	Bonifer	Nov 88	2	0.17
87	75,787	11.1	Umatilla RM 89	Nov 88	85	0.09
87	79,984	10.8	Bonifer	Mar-May 89	227	0.28
87	80,932	10.8	Nr. Bonifer	Mar 89	270	0.33
88	00,750	12.0	Bonifer	Oct 89	77	0.10
88	83,853	12.0	Nr. Bonifer	Oct 89	83	0.08
88	99,775 <i>la</i>	18.8	Umatilla RM 23	Apr 90	NA	NA
88	114,345	9.0	Bonifer	Mar 90	813	0.54
88	117,427	9.8	Nr. Bonifer	Mar 90	793	0.88
89	00,438	11.5	Bonifer	Oct 90	5	<0.01
89	77,998	13.4	Nr. Bonifer	Oct 90	4	<0.01
89	100,508	10.1	Bonifer	Mar 91	237	0.24
89	98,151	11.0	Nr. Bonifer	Mar 91	171	0.18
89	98,733 <i>/c</i>	20.3	Umatilla RM 3 & 89	Apr-May 91	NA	NA
90	81,145	18.5	Bonifer	Nov 91	84	0.08
90	70,480	18.8	Nr. Bonifer	Nov 91	39	0.05
90	98,254	10.7	Umatilla RM 3 & 89	Apr- May 92	0	0.00
90	109,101	9.2	Bonifer	Apr 92	30	0.03
90	90,929	8.5	Mouth of Meacham Cr.	Apr 92	25	0.03
91	955,752	35.4	Umatilla AM 80	May 92	0	0.00
91	294,450 <i>ld</i>	32.5	Umatilla RM 80	May 92	NA	NA
91	132,929	11.5	Umatilla RM 80	Nov 92	72	0.05
91	101,418	19.4	Umatilla RM 80	Nov 92	8	co.01
91	188,940	14.5	Umatilla RM 80	Mar 93	384	0.19
91	200,782	8.3	Umatilla RM 80	Mar 93	78	0.04
91	98,088	20.3	Uma. RM 3. 27.3 & 89	Apr 93	0	0.00

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Table 18. (cont.)

Brood Year	Number of Juveniles Released	Size at Release	Release Location	Dated Release	Number of Adults Recovered	% Survival
92	667,367	27.6	Umatilla RM 80	June 93	0	0.00
92	460,009	19.9	Umatilla RM 80	Nov 93	34	<0.01
92	205,143	8.4	Umatilla RM 80	Mar 94	122	0.06
92	152,854	11.5	Umatilla RM 73.5	Mar 94	799	0.52
92	252,246	12.3	Umatilla RM 80	Mar 94	1,243	0.48
92	0.890 /e	8.2	Umatilla RM 3 & 29.2	Mar-Apr 94		
93	839,377	30.4	Imeques (RM 80)	May 94	0	0.00
93	378,225	a.7	Imeques (AM 80)	Nov 94	27	<0.01
93	247,071	10.3	Imeques (RM 80)	April 95	137	0.06
93	275,804	7.9	Imeques (RM 80)	Mar 95	217	0.08
93	74,735	14.4	Imeques (RM 80)	Mar 95	24	0.03
93	74,921	11.4	Imeques (RM 80)	April 95	15	0.02

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- /a These fish were not coded-wire tagged and were reared at a different hatchery and released at a different size than the coded-wire tagged fish, thus they were not included in estimation of total adult recoveries.
- /b These fish were not coded-wire tagged, but were included with the coded-wire tagged fish released at RM 23 and near Bonifer to estimate total adults recovered.
- /c The same coded-wire tag code was released both in the Wind River (Washington) and Umatilla River. This eliminates any possible evaluation of survival from Umatilla River releases.
- /d These fish were not coded-wire tagged and were reared at a different hatchery than the coded-wire tagged group and were not included with that group to estimate total adults recovered.
- /e These fish were not coded-wire tagged, but were included with the coded-wire tagged fish released at RM 80 to estimate total adults recovered.

An acclimation evaluation study was conducted with yearlings every year from 1988 through 1992 (Table 18). Results from these studies have been discussed-previously (Rowan 1996) and are not discussed in this report.

Fall releases have been made from 1988 to 1994 in the mainstem Umatilla River (RM 80 and 89) and in Meacham Creek at RM 2 (Table 18). Releases have occurred in October and November and fish have ranged in size from 8.7 to 21.4/lb..

The estimated total survival rates (through age-6) from individual releases made from 1988 through 1990 (1987 through 1989 brood years) have ranged from 0.005% for a release made in 1990 to 0.17% for a release in 1988 (Table 18). Survival rates to the Umatilla River have ranged from 0.003 to 0.17% (Appendix Q). Recovery data for the 1991, 1992

and 1993 releases are incomplete. Preliminary survival rates range from 0.006% for a group released in 1992 to 0.08% for a group released in 1991. Survival rates to the Umatilla River also range from 0.006 to 0.08% for the same releases. An estimated 88.8% of all recoveries are from the Umatilla River, 8.1% are from Columbia River fisheries, and 3.1% are from terminal areas outside the Umatilla River. Recoveries from the 1994 releases include age-3 fish only and are not discussed in this report.

Acclimation evaluation studies were conducted with fall releases every year from 1988 through 1991 (Table 18). Results from these studies have been discussed previously (Rowan 1996) and are not discussed in this report.

Spring releases of subyearlings have been made in 1992, 1993 and 1994. All releases have occurred at RM 80 in May and June and fish have ranged in size from 27.6 to 35.9/lb. No recoveries have yet been reported.

Comparison of fall releases and yearling releases from the 1987 through 1989 broods shows that the survival rates of the yearling releases were higher. The survival rates were 3.6 to 36.4 times higher for yearlings and averaged 7.3 times higher. Recovery data for the 1990 and 1991 broods are incomplete. Preliminary survival rates for the 1990 brood are higher for the fall releases than the yearling releases (0.06 versus 0.03%). However, the yearling releases were outmigrating during extreme flood conditions which may have had a negative impact on juvenile survival. Preliminary survival rates for the 1991 and 1992 brood years combined are higher for the yearling releases (0.26 versus 0.12 %).

### Coho

Coho salmon from Tanner Creek stock have been released in the Umatilla River every year beginning in 1987 (Table 19). Juveniles from Umatilla River broodstock were also released in 1995. All fish have been released as yearlings in the mainstem Umatilla River from RM 9 to RM 70. Groups of coded-wire tagged fish have been released every year in March and/or April with fish ranging in size from 11.2 to 19.7/lb.. In addition, two production groups of non-tagged fish were released in 1995.

The estimated total survival rates of individual releases made from 1987 through 1994 have ranged from 0.16% for a group released in 1991 to 4.53% for a group released in 1988 (Table 19). Survival rates to the Umatilla River have ranged from 0.04 to 0.99% for the same releases (Appendix R). Recovery data for the 1995 and 1996 releases are incomplete and are not discussed in this report.

Total exploitation of coho (1985 through 1988 brood) is 83.5%. Individual exploitation rates for ocean commercial and Columbia River gillnet catches are 33.4 and 23.5%, respectively. Sport and treaty exploitation rates are 42.0 and 1.1%. Total exploitation of coho (1989 through 1992 brood) is 58.3%. Individual exploitation rates for

Table 19. Liberation and survival information for **coho** salmon released in the Umatilla River Basin. /a

Brood Year	Number of Juveniles Released	Size at Release	Release Location	Date of Release	Number of Adults Recovered	% Survival
85	181,889	13.5	<b>Minthorn</b>	Apr 87	15,936	1.68
85	788,880 <b>/b</b>	14.0	Uma Rm 23	Apr 87		
88	998,433	16.6	<b>Uma Rm 9 &amp; 23</b>	Mar-Apr 88	45,131	4.53
87	157,299	18.2	<b>Minthorn</b>	Mar 89	1,674	1.06
87	75,970	17.2	<b>Nr. Minthorn</b>	Mar.89	4,690	0.57
87	753,837 <b>/c</b>	15.3-19.7	Uma Rm 56 & 70	Mar 89		
88	87,309	13.5	<b>Minthorn</b>	Mar 90	2,069	3.07
88	59,682	13.3	<b>Nr. Minthorn</b>	Mar 90	26,606	3.11
88	796,842 <b>/c</b>	14.7	Uma Rm 23 & 70	Mar-Apr 90		
88	65,095	11.2	<b>Minthorn</b>	Apr 90	2,628	4.04
89	152,974	15.4	<b>Minthorn</b>	Mar 91	305	0.20
89	802,655	16.4-17.1	Uma Rm 56 to 70	Mar 91	1,302	0.16
90	961,386	15.5-15.7	Uma Rm 56 & 60	Mar 92	7,833	0.81
91	892,678	17.6	Uma Rm 42.5 & 60	Apr 93	1,859	0.21
92	884,105	17.6	Uma Rm 42.5 & 60	Apr 94	2,158	0.24
93	999,554	14.6	Uma Rm 42.5 & 60	Mar-Apr 95	473	0.05
93	191,854 <b>/d</b>	13.9	Uma Rm 60	Apr 95	NA	NA
93	322,858 <b>/d</b>	20.3	Uma Rm 42.5	Feb- Mar 95	NA	NA
94	465,769	17.9	Uma Rm 42.5	Mar 96	0	0.00
94	<b>1,011,614</b>	18.3	Uma Rm 42.5 & 60	Apr 96	0	0.00

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/a Survival data for the 1994 brood includes age-2 fish only (1996 returns).

/b These fish were not coded-wire tagged, but were included with the fish released at **Minthorn** to estimate total adult recoveries./c These fish were not coded-wire tagged, but were included with the fish released near **Minthorn** to estimate total adult recoveries.

/d These fish were not coded-wire tagged and were reared at a different hatchery than the coded-wire tagged fish, thus were not included to estimate total adult recoveries.

ocean commercial and Columbia River gillnet catches are 3.5 and 33.8%, respectively. Sport and treaty exploitation rates are 60.4 and 2.3%.

Acclimation evaluation studies were conducted from 1989 through 1991 (Table 19). Results from these studies have been discussed previously (Rowan 1996) and are not discussed in this report.

## **Objective 5: Facility Maintenance**

### **Task 5.1: Facility Maintenance and Repair**

Regularly scheduled maintenance and repair was performed at Bonifer, Minthorn, Imeques, Thornhollow and Three Mile Dam in 1996. Routine facility maintenance work consisted mostly of weed abatement and maintenance of the electric fence at Bonifer. Critical maintenance and repair was performed by Umatilla Passage Facility Operation and Maintenance crews. Tasks included: 1) removal of rock and gravel deposited at the Imeques intake and Bonifer outlet during high water periods, 2) repair of the Imeques intake baffle, 3) repair of the Bonifer truck turn around area, 4) repair of pressure relief and gate valves at Thornhollow, 5) insulation of Thornhollow pumps against freezing, 6) replacement of rock and gravel lost at Minthorn during flood conditions, 7) moving the propane tank at Minthorn to a location outside the flood plane and 8) repair of the Thornhollow access road and direct stream release site. The Minthorn pump and alarm wiring schemes were also modified to create a more versatile and reliable system and the brood holding area was modified to eliminate problems with fish escaping. Other projects included initial startup of the Three Mile Dam adult holding and spawning facility. Several modifications will need to be made prior to the next spawning season.

## **Objective 6: Umatilla Satellite Facilities Planning**

### **Task 6.1: Umatilla Satellite Facilities Review**

Meetings with CTUIR, BPA, ODFW and engineering and architectural firms were held to discuss designs for planned and ongoing construction of other Umatilla Hatchery satellite facilities. These include one or two acclimation facilities located on the Umatilla River and an adult holding and spawning facilities located on the South Fork Walla Walla River (presently under construction). Review and comments were provided.

## **Objective 7: Information Dissemination**

### **Task 7.1: Annual Report**

Data and information associated with the operation and maintenance of Minthorn, Bonifer, Imeques, Thornhollow and Three Mile Dam facilities were compiled and summarized. This annual report was written and submitted to BPA for dissemination.



### Literature Cited

- Lofy, P.T., and G. James.** 1988. Operation, maintenance and evaluation of Bonifer and **Minthorn** Springs juvenile release and adult collection facilities. Report submitted to Bonneville Power Administration, Project No. 83-435. 28 pp.
- Rowan, G.R.** 1996. Umatilla Hatchery **satelite** facilities operation and maintenance. Report submitted to Bonneville Power Administration, Project No. 83-435. 58 pp.
- Zimmerman, B.C., and B. Duke.** 1996. Trapping and transportation of adult and juvenile salmon in the lower Umatilla River in northwest Oregon, 19951996. Report submitted to Bonneville Power Administration, Project No. 88-022. 47 pp.

## APPENDICES

Appendix A. Liberation and survival information for summer steelhead released in the Umatilla River.

Brood	CWT Cods	Released	Total Released	Estimated Recoveries		Year Recovered	Age at Recovery	Omgon			Umatilla River	ottla
				Number	%			Col. R. Net	/1 Sport	/2		
87	073859	9829	10187	24	0.24	89	2	6			18	
				32	0.33	90	3	6			26	
			Totals	56	0.57							
87	073960	9721	10075	34	0.35	89	2	14			20	
				45	0.46	90	3	20			25	
			Totals	79	0.81							
97	073861	9925	10207	37	0.37	89	2	10			27	
				32	0.32	90	3	10	2		20	
			Totals	69	0.70							
07	073959	9689	10423	36	0.37	89	2			10	26	
				36	0.37	90	3	11			23	2 /3
			Totals	72	0.74							
87	073957	9455	10171	32	0.34	89	2	7			25	
				13	0.14	90	3				13	
				3	0.03	91	4				2	1 /4
			Totals	48	0.51							
87	073858	9448	10163	9	0.10	89	2				9	
				21	0.22	90	3			2	19	
			Totals	30	0.32							
88	074720	8794	17372	0	0.00	90	2					
				5	0.06	91	3			3	2	
			Totals	5	0.06							
88	074723	9799	17382	0	0.00	90	2					
				2	0.02	91	3				2	
			Totals	2	0.02							
88	074724	8784	17372	0	0.00	90	2					
				3	0.03	91	3				3	
			Totals	3	0.03							
88	074715	8800	9873	1	0.01	90	2				1	
				7	0.08	91	3				7	
			Totals	8	0.09							
88	074717	8791	9864	1	0.01	90	2				1	
				9	0.10	91	3				9	
			Totals	10	0.11							
88	074718	8778	9649	0	0.00	90	2					
				1	0.01	91	3				1	
			Totals	1	0.01							
89	076212	9331	20240	57	0.61	91	2	5		9	43	
				24	0.26	92	3	5			19	
			Totals	81	0.07							

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## Appendix A (cont.)

Brood	CWT Code	CWT Released	Total Released	Estimated Recoveries		Year Recovered	Age at Recovery	aegotl				Other
				Number	%			Col. R. Net	/1 Sport	/2 Umatilla River		
89	076213	9133	19611	63	0.69	91	2	5	2	56		
				28	0.31	92	3	2	26			
			Totals	91	1.00							
89	076214	9000	19696	45	0.50	91	2	7	6	32		
				38	0.42	92	3	15	23			
			Totals	83	0.91							
89	076216	9511	9030	67	0.70	91	2	9	5	53		
				27	0.28	92	3	9	2	16		
			Totals	94	0.90							
89	076216	9525	9045	62	0.05	91	2	5	2	55		
				39	0.41	92	3	14	2	23		
				1	0.01	93	4		1			
			Totals	102	1.07							
69	076217	9454	9771	56	0.59	91	2		25	31		
				26	0.28	92	3	14	12			
			Totals	82	0.87							
90	076340	9035	14221	35	0.36	92	2	7	7	21		
				47	0.40	93	3	7	9	31		
				6	0.06	94	4		6			
			Totals	88	0.82							
90	076341	9819	14198	32	0.33	92	2	2	4	26		
				40	0.41	93	3	15	3	22		
				1	0.01	94	4		1			
			Totals	73	0.74							
90	076342	9614	14191	47	0.46	92	2	4	7	36		
				46	0.49	93	3	13	6	29		
				2	0.02	96	5	2				
			Totals	95	0.97							
90	076343	9432	9754	46	0.49	92	2	10	4	32		
				37	0.39	93	3	6	2	29		
			Totals	83	0.88							
90	076344	9467	9790	30	0.32	92	2	3	1	26		
				36	0.38	93	3	5	5	26		
				1	0.01	94	4		1			
			Totals	67	0.71							
90	076345	9458	9761	42	0.44	92	2	14		26		
				42	0.44	93	3	7	2	33		
			Totals	84	0.88							
91	076838	10562	22469	1	0.01	93	2			1		
				0	0.00	94	3					
			Totals	1	0.01							
91	076839	10275	22662	0	0.00	93	2					
				0	0.00	94	3					
				1	0.01	96	4		1			
			Totals	1	0.01							

Revised: 3-10-57

File Name: C:\123R2\FILES\STSSURV2

## Appendix A (cont.)

Brood	CWT Code	Released	Total Released	Estimated Recoveries		Year Recovered	Age at Recovery	Oregon				Otha
				Number	%			Col. R. Net	/1 Sport	/2 River	Umatilla	
91	075840	10105	22288	0	0.00	93	2					
				1	0.01	94	3				1	
				Totals	1	0.01						
91	075841	10106	22262	0	0.00	93	2					
				2	0.02	94	3	2				
				Totals	2	0.02						
91	076842	9498	21365	0	0.00	93	2					
				0	0.00	94	3					
				Totals	0	0.00						
91	076843	9747	20923		0.00	93	2					
				4	0.04	94	3	4				
				Totals	4	0.04						
91	074127	10203	22059	5	0.05	93	2				5	
				21	0.21	94	3				21	
				Totals	26	0.25						
91	073882	10594	22902	2	0.02	93	2				2	
				12	0.11	94	3	6			6	
				Totals	14	0.13						
91	073759	10394	22474	15	0.14	93	2	6			9	
				8	0.08	94	3	4	2		2	
				Totals	23	0.22						
92	076058	10194	15115	40	0.39	94	2	5	3		32	
				30	0.29	95	3	5			25	
				70	0.69							
92	076059	9792	14922	22	0.22	94	2		2		20	
				20	0.20	95	3	2			18	
				42	0.43							
92	076060	9440	14787	49	0.52	94	2		5		44	
				25	0.26	95	3		9		16	
				74	0.78							
92	076055	10031	16016	39	0.39	94	2				38	1 /3
				17	0.17	95	3	2			15	
				56	0.56							
92	076056	9418	15940	29	0.31	94	2	1			28	
				27	0.29	95	3		16		11	
				56	0.59							
92	076067	9643	16023	37	0.36	94	2		3		34	
				23	0.24	95	3	4			19	
				60	0.62							
92	076052	13117	23862	1	0.01	94	2				1	
				7	0.05	95	3				7	
				8	0.06							

Revised: 3-10-97

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Appendix A (cont.)

Brood	CWT Code	CWT Released	Total Released	Estimated Recoveries		Year Recovered	Age at Recovery	Oregon				Other
				Number	%			Col. R. Net	/1	Sport	/2	
92	076053	11410	21644	0	0.00	94	2					
				11	0.10	95	3					11
				11	0.10							
	076054	9907		1	0.01	94	2					1
			19959	7	0.07	95	3					7
				8	0.08							
93	070139	8595	26347	4	0.05	95	2					4
93	070140	8400	25750	0	0.00	95	2					
93	070141	9952	24783	23	0.23	95	2			3		20
93	070142	9985	24815	47	0.47	95	2	5		21		20
												1 /5
93	070143	10471	26749	32	0.31	95	2	4				28
93	070144	9651	24654	38	0.39	95	2	2		4		32
Revised: 3-10-97												
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/1 Bonneville, Dalles and John Day Pools.  
 /2 Columbia River and fresh water sport.  
 /3 CDFO Net in Selma  
 /4 Dworshak National Fish Hatchery.  
 /5 Hanford Reach sport.

Appendix B. Liberation and survival information for fall chinook salmon released in the Umatilla River./1

								Oregon										
								Ocean					Freshwater					
Br. Yr.	CWT Code	CWT Rel.	Total Rel.	Estimated Recoveries		Year Rec.	Age	Col. R. Test Net					Treaty Spawn					
				No.	%			Com	Tm	w l	S p t	Gillnet	Fishery	S p t	Hath	Trap	Subs	Ground
81	050851	45707	305278	19	0.04	53	2				2	10						
				178	0.38	54	3	10				69					2	
				20	0.04	a5	4					16						
		Totals		217	0.48													
81	051057	102331	672057	53	0.05	83	2					8						
				480	0.45	84	3	27	1			181	3				9	
				50	0.05	55	4					39	1					
				6	0.01	88	5					5						
		Totals		569	0.58													
81	072553	102388	2828835	40	0.04	83	2					2						
				357	0.36	84	3	14				120	3				7	
				83	0.08	85	4				2	52		1				
				9	0.01	86	5							Bona.				
		Totals		489	0.48													
81	072741	98570	100564	7	0.01	83	2					4		3				
				18	0.02	84	3				2	11		Bona.			1	
				104	0.10	85	4	2		2		27	1	1	1	Bona. Ladder		
				40	0.04	86	5					27		Bona.	1	Bona. Ladder		
		Totals		167	0.17													
52	072020	98448	228412	12	0.01	85	3	3										
				54	0.08	86	4	3				15						
				5	0.01	87	5											
			4		0.00	88	6					4						
		Totals		75	0.08													
83	073124	210441	986250	2	0.00	54	1											2
				82	0.04	85	2					18						
				501	0.24	86	3	18				205						
				873	0.41	87	4	3				410	1	3		1	Bona. Ladder	
				198	0.09	88	5					115	4					
					0.00	89	6											
		Totals		1865	0.78													
84	073127	88308	198182	28	0.03	85	2					13						
				118	0.13	86	3	5				27				1		
				484	0.55	87	4	51		6		185	6			1	Bona. Ladder	
				52	0.08	88	5	4				31						
				0	0.00	89	6											
		Totals		710	0.80													
84	073326	208758	3223172	34	0.02	86	2					13					2	
				359	0.17	87	3	11				128						
				853	0.41	88	4	9				509	7					
				537	0.26	89	5	6				239	3					
				25	0.01	90	6					9						
		Totals		1808	0.07													
84	073162	30838	51000	15	0.06	87	3					4						
				84	0.27	88	4					38						
				98	0.32	89	5	8				58				2		
				8	0.03	90	6					8						
		Totals		208	0.67													

Revised: 3-18-87

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## Appendix S (cont.)

CWT Coda	Year Rec.	Washington							Calif. Ocean	Canada Ocean			Alaska Ocean		FWS Freshwater			NMFS Marine
		Ocean				Freshwater				Ocean		Spt.	Ocean		Freshwater			
		Net & Seine	Treaty Troll	Spt.	Hatch.	Trap	Ground	Corn.	Spt.	Corn.	Seine		Corn.	Spl.	Hatch.	Trap		
050851	83 54 85	a	7		4	3				77 4	3	4						
051057	a3 84 85 86	24	32 17 6	2 2		12				6 197 4		5 4			SCNRH 1		2	
072663	83 84 85 86	14 2	21 11 6	1	5	6	2 2		3	7 170 4	4	9			SCNRH 1			
072741	83 54 55 86				20		2			32 11		4	2 12 1					
072829	85 86 57 88	4	7 2				1 2			19 3	2	4	6					
073124	84 a5 86 87 88 89	4 2	6 2		2	5	a a 8 1	44 86 187		155 142 29	2 5 6 3	4	5 9 88 38	1 1			2	
073127	85 86 87 88 89	5 a	4 23		2 6	7 8	15 17 7		9	37 165 23	19 2	4	2 12				5 2	
073326	86 87 88 89 90	3 21 7			2	22 7 a	2 5 5	21 43 69	5	127 157 68 13	14 6 5 5	5 7	26 79 125 3	1 2	LWSH 1		5 2	
073152	87 88 89 90				2		3 7			9 30 20	4 2	5	5 3	1				

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## Appendix B. (cont.)

Appendix B: (Cont.)

Yr.	CWT Code	CWT Rel.	Total Rel.	Estimated Recoveries		Year Rec.	Age	Oregon							
				NO.	%			Ocean		Freshwater				Treaty Spawn	
								Com	Trawl	Spt Gillnet	Fishery Spt	Hatch Trap	Subs		Ground
84	073327	88396	206815	123	0.14	86	2			29			70		
				361	0.41	67	3	4	13	93	5				
				1567	1.77	88	4	38	4	475	1	17	32		
				712	0.81	89	5	2	4	339			13	9	
				84	0.10	90	6			34			1		
				1	0.00	91	7								
			Totals	2848	3.22										
85	073533	20636	197432	2	0.01	87	2								
				50	0.24	88	3			17					
				59	0.28	89	4			34					
				22	0.11	90	5								
				21	0.10	91	6								
			Totals		0.75										
85	073034	21335	198153	18	0.08	88	3					9			
				45	0.21	89	4			20					
				18	0.08	90	5			10					
				0	0.00	91	6								
			Totals	81	0.38										
85	073835	20690	197488	4	0.02	87	2		4						
				8	0.04	88	3	4							
				24	0.12	89	4			15					
				37	0.18	90	5			14					
				4	0.02	91	6								
			Totals	77	0.37										
85	073836	20170	196952	26	0.13	88	3	2		7		3			
				60	0.30	89	4			29					
				13	0.08	90	5			13					
			3		0.01	91	6			3					
			Totals	102	0.51										
85	073037	20982	197788	5	0.02	87	2								
				34	0.16	88	3			7					
				35	0.17	89	4			7					
				32	0.15	90	5			22					
					0.00	91	6								
			Totals		0.51										
85	073838	20815	203103	2	0.01	87	2								
				13	0.08	88	3			6					
				40	0.18	89	4			15					
				25	0.12	90	5			13					
				1	0.00	91	6								
			Totals	81	0.39										
es	073839	21658	208958	5	0.02	87	2			4					
				22	0.10	88	3	4		15					
				60	0.28	89	4			40					
				29	0.13	90	5			24					
				3	0.01	91	6								
			Totals	119	0.55										
85	073840	20269	207550	8	0.03	87	2								
				15	0.07	88	3	1		4					
				68	0.34	89	4			25					
				25	0.12	90	5			13					
				0	0.00	91	6								
			Totals	114	0.58										

Revised: 3-19-97

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## Appendix B. (cont.)

Appendix 1 (cont.)

CWT Year Code Rec.	Washington								Calif. Ocean	Canada ocean			Alaska O c e a n		Fws Freshwater		NMFS Marine	
	Ocean				Freshwater					Com.	Seine	Spt.	Corn.	Spt.	Hatch.	Trap		
	Net 6	Treaty	Spawn		Spt.	Hatch.	Trap	Ground										
073327	86						3	6			5	9		1				
	87		22	2	10	18	8			25	68	68	9	2				14
	88	89	28	1	69	24	17			682	1	17	49	1				
	89	12	9			14	20			198	4	6	49					
	90									11		7	31					
	91						1											
073833	87													2				
	88																	
	89				2		1			4	5							
	90						3			17				5				
	91						2			15				5				
								21										
073834	88						1			2		8						
	89									22				2				
	90									6				2				
	91																	
073835	87																	
	88						4											
	89						3			4				2				
	90		8				2			3				10				
	91									4								
073836	88									12								
	89						4			3	2			5				
	90																	
	91																	
073837	87																	
	88						1			5								
	89						3			8								
	90						1			3				6				
	91						1											
073838	87																	
	88					5	2				2							
	89						3			4				15				
	90						1			11				1				
	91																	
073539	57																	
	88									3								
	89					1	3	11 from C of R net @ PR		11				5				
	90						1			4								
	91									3								
073540	07											5						
	88						2			8								
	89						5			36				2				
	90						2							10				
	91																	

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## Appendix B. (cont.)

Br. Yr.	CWT coda	CWT Rel.	Total Rel.	Estimated Recoveries		Year Rec.	Age	Oregon									
				No.	%			Ocean			Freshwater					Treaty Subals	Spawn Ground
								Col.	R.	Test Net	Gillnet	Fishery	Spt	Hatch	Tnp		
85	073941	20895	208184	37	0.19	88	3				12						
				44	0.21	89	4				19						
				46	0.22	90	5				8						
				0	0.00	91	6										
				Totals	127	0.61											
85	073942	21694	208994	17	0.08	88	3	4			13						
				45	0.11	89	4				31						
				34	0.18	90	5				17						
				0	0.00	91	6										
				Totals	96	0.44											
85	073923	10103	22219	4	0.04	87	2				4						
				34	0.34	88	3			4				4			
				113	1.12	89	4	2			43				9		2
				74	0.73	90	5				36						3
				12	0.12	91	6				3				3		1
Totals	237	2.35															
85	073924	10243	22523	4	0.04	87	2				3						
				27	0.26	88	3						4	1	4		
				122	1.19	99	4	5		2	55			3		2	
				58	0.57	90	5				23			1	1	4	
				1	0.01	91	6							1	1		
Totals	212	2.07															
85	073925	9917	21907	5	0.05	87	2				3						
				33	0.33	88	3				7			1	2		
				102	1.03	89	4	9			30			8	4		4
				95	0.86	90	5				45			4		3	
				4	0.04	91	6										
1	0.01	92	7														
Totals	230	2.32															
85	073929	9499	20881	4	0.04	87	2				3						
				26	0.27	88	3				9			1	5		
				95	1.00	89	4	1			31		3	7	7		
				02	0.97	90	5				29			2			
				8	0.08	01	6				3						
4	0.04	92	7				4										
Totals	229	2.41															
85	073927	9976	21716	8	0.08	97	2				6						
				12	0.12	88	3			2				7			
				107	1.00	89	4			1	36			a			
				44	0.45	90	5	3			11			3			
				44	0.45	91	6				2						
Totals	215	2.19															
85	073929	10253	20796	15	0.15	88	3				4				1		
				111	1.09	99	4	10		1	35		3		2		
				100	0.98	90	5				45		15		2		3
				7	0.07	91	6										
				Totals	233	2.27											
85	073929	9970	20212	27	0.27	88	3				7		4				
				117	1.17	89	4	8			27		10				
				75	0.75	90	5				35				2		4
				8	0.08	91	6				5						
				Totals	227	2.28											

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## Appendix B, (cont.)

Appendix B (cont.

CWT code	Year Rec.	Washington								Calif. Owen		Canada Ocean Net & Seine			Alaska Owen		FWS Freshwater		NMFS Marine
		Owen				Freshwater				Corn.	Spt.	Com.	Seine	Spt.	Corn.	Spt.	Hatch.	Trap	
		Net & Seine	Treaty Troll	Spt.	Hatch.	Trap	Spawn Ground												
								Corn.	Spt.										
073341	88		1				2				1								
	89						3				3				2				
	90					4					3				5				
	91																		
073842	88																		
	89				1		5				7				1				
	90										9				8				
	01																		
073823	87																		
	88		3				1					5	14		1	2			
	89	2			2	2	1				39	4			6	1			
	90					3					8		10		10				
	01										4					1			
073024	07																		
	88					10					6				1				
	89	5	4		3	5	1				24	2			13				
	90						1				19				9				
	91																		
073825	87																		
	88					2										1			
	89	2	8		1		1				31	2	14		7	1			
	90						1				22				10				
	91										4								
	92						1												
073526	87																		
	88		2			5						3			2				
	89	5				5	1				31	3	7		1				
	90					43					9				10				
	91												5						
	92																		
073827	87																		
	88																		
	89	2	8		7	5	1				31	2			10	1			
	00						1				13	2	5		5				
	91								1										
073828	88			3								2	4						
	89	2				8					40	5			2	1			
	90	2					2				20	4			7				
	91										3				4				
073829	88			2									3	9					
	89	7				4	2				48				12				
	90				1		5				9				18	1			
	91							2			1								

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## Appendix B. (cont.)

								Oregon									
Br. Yr.	CWT Code	C W T Rel.	Total Rel.	Estimated Recoveries		Year Rec.	Age	Ocean				Freshwater					
				No.	%			Col. R. Ted Net				Treaty		Spawn			
								Com	Trawl	Spt Gillnet	Fishery Spt	Hatch	Trap		Subsals	Ground	
85	073030	10136	20548	9	0.00	07	2										
				42	0.41	88	3										
				140	1.38	89	4			4			3				
				95	0.94	00	5			62		1	3				
				14	0.14	91	6			25	16	Bonn.	3			2	
Totals				300	2.86											Includes 1 Crest	
85	073831	10053	20381	27	0.27	88	3										
				100	1.08	89	4			7			7				
				a 2	0.82	90	5	2		33			8			2	
				4	0.04	01	6			40			1			3	
										4							
Totals				222	2.21												
85	073832	10081	20438	6	0.08	87	2										
				16	0.16	88	3										
				112	1.11	89	4			3			1				
				93	0.92	90	5	3		55			7			2	
				23	0.23	01	6			35						3	
Totals				250	2.46												
86	073912	40793	487572	10	0.02	88	2										
				88	0.22	89	3			3			3				
				186	0.41	90	4			39					2		
				27	0.07	91	5	7		71					1		
				0	0.00	02	6			10							
Totals				201	0.71												
86	073913	41096	501266	18	0.04	88	2										
				106	0.28	89	3			4							
				201	0.49	90	4			42	1						
				35	0.08	91	5	2		6							
				0	0.00	92	6										
Totals				362	0.88												
86	073014	39187	477992	16	0.04	88	2										
				96	0.24	89	3			4			7				
				104	0.50	90	4	5		24			6		3		
				30	0.08	91	5			69							
				0	0.00	92	6			8							
Totals				336	0.88												
86	073815	643	670	0	0.00	90	4										
				0	0.00	01	5										
				0	0.00	92	6										
Totals				0	0.00												
86	073916	645	672	0	0.00	90	4										
				0	0.00	91	5										
				0	0.00	82	6										
Totals				0	0.00												
86	074035	632	856	5	0.79	89	3										
				0	0.00	90	4			4							
				0	0.00	01	5										
				0	0.00	02	6										
Totals				5	0.70												
86	074038	42068	52317	279	0.66	88	2										
				198	0.47	88	3			3			18		256		
				764	1.82	90	4	5		40			37				
				180	0.43	91	5	25		6	223	8	46		6		
				26	0.08	82	6	2		45	9	31		1			
Totals				1447	3.44												

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## Appendix B. (cont.)

Appendix B. (cont.)

C W T Year c o d a Rec.	Washington							Calif. Ocean	Canada ocean			Alaska Ocean	FWS Freshwater		NMFS Marine		
	Ocean			Freshwater					Corn.	Seine	Spt.		Corn.	Spt.		Hatch.	Trap
	Net & Seine	Troll	S p t .	Hatch.	Trap	Ground											
073530 87					3					6							
88									6	6	10	4					
89	5	2			15	4			28		14	6					
90						4			18			27					
91						1			3								
073531 88					5					8							
89	7	5			1	5			31		6	8	1				
90						7			21			10					
01																	
073532 87															2		
88		5		7													
89					4	1			19	2	13	6					
90						2			23	6		24					
91							1		4			1					
073812 88						1				3							
89		2		1		17			24			2					
90		4			3	8			38			33					
91						3	2		8	3			1				
92																	
073913 88						2				3	5	4					
89		1		1	5	9			30	6		8	1				
KY	2					9		27	47	3		22					
91	2					2	1		3		5	16					
02																	
073014 88						2				3							
89				5		13		5	32			1					
90				2	11	13			51	2		44	1				
91						1	3		11			7					
92																	
073915 90																	
91																	
02																	
073916 90																	
91																	
92																	
074035 89																	
90																	
91																	
074038 88																	
89		5	6	9	6				3	25	52	4			2		
90	23	20		20	10	8			301	6		61	1		2		
91	1					3	11	7	41		5	24					
92								19									

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## Appendix B. (cont.)

								Oregon																	
								Ocean							Freshwater										
Br. Yr.	CWT Code	CWT Rel.	Total Rel.	Estimated Recoveries		Year Rec.	Age	Col. R. Test Net							Treaty Spawn										
				No.	%			Com	T	r	a	w	I	S	p	t	Gillnet	Fishery	S	p	t	Hatch	Trap	Subs	Ground
86	074036	38978	43474	237	0.81	88	2							2								233			
				123	0.32	89	3															53			
				701	1.80	90	4	27		5	230		3									34			5
				157	0.40	91	5						9									15			2
				9	0.02	82	6															1			
			Totals	1227	3.15																				
66	074038	38509	50480	175	0.44	88	2															174			
				171	0.43	89	3															44			
				505	1.28	90	4	13		7	29											21			4
				120	0.30	91	5			2	IX?		2	2								13			
				5	0.01	92	6			2	40											1			
			Totals	976	2.47																				
86	074037	38405	49070	168	0.44	88	2															165			
				110	0.29	89	3															34			
				527	1.37	90	4	27		12	26											30			4
				191	0.50	91	5			5	145											18			1
				5	0.01	92	6				77		19												
			Totals	1001	2.61																				
87	075007	198285	1886757	20	0.01	89	2															10			
				44	0.02	90	3															1			
				67	0.03	91	4															4			
				16	0.01	92	5																		
				0	0.00	93	6																		
			Totals		0.07																				
87	074539	4438	4323	1	0.02	90	3																		
				17	0.38	91	4															1			
				1	0.02	92	5																		
				0	0.00	93	6																		
			Totals	19	0.43																				
87	074540	4289	4880	2	0.05	90	3																		
				5	0.12	91	4																		
				3	0.07	92	5																		
				0	0.00	93	6																		
			Totals	10	0.23																				
87	074541	4533	4625	10	0.22	90	3																		
				14	0.31	91	4																		
				4	0.09	92	5																		
				0	0.00	93	6																		
			Totals	28	0.62																				
87	074536	24656	26858	2	0.01	89	2																		
				16	0.06	90	3																		
				70	0.26	91	4																		
				12	0.05	92	5																		
				0	0.00	93	6																		
			Totals	100	0.41																				
87	074537	23403	25493	3	0.01	89	2																		
				33	0.14	90	3																		
				89	0.38	91	4																		
				19	0.08	92	5																		
				0	0.00	93	6																		
			Totals		0.62																				

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## Appendix B. (cont.)

Appendix B. (cont.)

CWT Year code Rec.	Washington								Calif. Ocean	Canada			Alaska		FWS		NMFS Marine
	Ocean				Freshwater					Com.	Seine	Spt.	Corn.	Spt.	Freshwater		
	Nat	Treaty	Spawn		Spt.	Hatch.	Trap	Ground							Hatch.	Trap	
	Corn.	spt.	Seine	Troll					Corn.	Spt.	Com.	Seine	Spt.	Corn.	Spt.	Hatch.	Trap
074039 88						2											
89		2	2	11		1					6	26	8	5			2
90	14	21		23	16	5					224	11		83			
91	2	2					7		2		37		10	23			
92											6			2			
074036 88						1											
89		23		6	5							22	30	2	1		2
90	15	27		6	8	4			4		201	3		45			
91							9				40			16			
92							1				3						
074037 88																	
89		4		1	12	1					4	15		1			
90	4	22		9	1	6			4		210	3	5	52			
91	2	5					10	7			29	4		19			
92											4						
075007 89						4						6					
90		2				1					16	3		8			
91						2	4				17			17			
92						2	3	1			7			3			
93																	
074530 90												1					
91						1	1				9						
a2							1										
93																	
074540 90																	
91											3						
92							1										
83																	
074541 so						1					6						
91							1				11			2			
92																	
93																	
074536 89																	
90						3	2							1	1		
91					2		4				14		15	6			
92											3			1			
93																	
074537 89												2					
90		9		1			1		2		4	6					
91		3					3	1			24			22			
92						1	1				7			7			
93																	

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## Appendix B. (cont.)

Appendix B (cont.)								Oregon														
Br. Yr.	CWT cods	CWT Rel.	Total Rel.	Estimated Recoveries		Year Rec.	Age	Ocean			Freshwater				Treaty Subs	Spawn Ground						
				No.	%			Com	Trawl	Spt	Col. R. Gillnet	Test Net Fishery	Spt	Hatch			Temp					
87	074538	25089	27330	2	0.01	89	2	15			1	2	18	1	2		2					
				32	0.13	90	3												4			
				69	0.26	91	4															
				27	0.11	92	5													11		
				2	0.01	93	6														8	3
Totals				132	0.53																	
88	074750	28790	27071	0	0.00	90	2					6					1					
				1	0.00	91	3												4			
				13	0.05	92	4															
				12	0.04	93	5													2		
				1	0.00	84	6															1
Totals				27	0.10																	
88	074760	24285	25428	0	0.00	90	2					4										
				1	0.00	91	3												4			
				18	0.07	92	4															
				4	0.02	93	5													5		
				0	0.00	94	6															
Totals				23	0.00																	
88	074763	25350	25633	0	0.00	90	2					3					2					
				3	0.01	91	3												4			
				13	0.05	92	4															
				0	0.00	93	5													2		
				0	0.00	04	6															
Totals				16	0.08																	
88	074753	26358	28770	2	0.01	90	2	2		3		3					1					
				7	0.03	91	3												4			
				14	0.05	92	4															
				9	0.03	93	5													5		
				1	0.00	94	6															1
Totals				33	0.13																	
88	074754	25028	28817	6	0.02	so	2					4					6					
				10	0.04	91	3												4			
				5	0.02	92	4															
				5	0.02	93	5													2		
				0	0.00	84	6															
Totals				26	0.10																	
88	074757	25438	25438	2	0.01	90	2					2					2					
				4	0.02	91	3												4			
				12	0.05	82	4															
				1	0.00	93	5													2		
				0	0.00	94	6															
Totals				19	0.07																	
88	074646	52228	797904	4	0.01	90	2					7					2					
				12	0.02	91	3												4			
				46	0.09	92	4															
				2	0.00	93	5													1		
				0	0.00	94	6															
Totals				64	0.12																	
88	074647	4877 1	797003	10	0.02	00	2					3					1					
				9	0.02	91	3												4			
				34	0.07	92	4															
				11	0.02	93	5													6		
				0	0.00	94	6															
Totals				64	0.13																	

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## Appendix B. (cont.)

CWT Year Code Rec.	Washington								Calif. Ocean	Canada Ocean			Alaska Ocean		FWS Freshwater		NMFS Marine
	Ocean				Freshwater					Corn.	Seine	Spt.	Corn.	Spt.	Hatch.	Trap	
	Net & Trawl		Treaty		Spawn		Ground										
	Corn.	Spt.	Seine	Trawl	Spt.	Hatch.		Trap									
074532 89																	
90		6			3		2							7			
91					3		1	1				15		2			
92						8						5					
93																	
94								2									
074752 90																	
91																	
92							1	2				3		1			
93								3				3	4				
94																	
074750 90																	
91							1										
92					2		1	1				10		3			
93																	
94																	
074763 90																	
91							1										
92								1				6		1			
93																	
94																	
074753 so																	
91													2				
92								2				5		3			
93																	
a4																	
074754 90																	
01							1							4			
02					2			1									
93							1	2									
94																	
074757 so																	
91																	
92							1	2					4				
93							1										
94																	
074845 00																	
91							1						1				
92							3	2	1			12		16			
93								1									
94																	
074547 90																	
01							3	1				3	1	5			
92						3	3	3				11	2	7			
93						3		2									
94																	

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## Appendix S. (cont.)

Appendix B. (cont.)

Br. Yr.	CWT code	CWT Rel.	Total Rel.	Ed mated Recoveries		Year Rec.	Age	Oregon												
				No.	%			Ocean					Freshwater							
								Com	Trawl	Spt	Col. R.	Test Net	Spt	Hatch	Trap	Treaty Spawn				
																Subals	Ground			
88	074648	52244	797903	5	0.01	90	2													
				14	0.03	91	3						7							
				30	0.08	92	4						2							
				9	0.02	a3	5						2					1		
				0	0.00	04	6													
			Totals	58	0.11															
89	075403	52612	806567	8	0.02	91	2						3						5	
				24	0.05	92	3						2						1	
				59	0.11	93	4						13						5	
				28	0.05	94	5						3							
			Totals	119	0.23															
89	075404	53180	808560	12	0.02	91	2						6						3	
				18	0.03	92	3						2							
				87	0.13	93	4						24		a					
				16	0.03	94	5						6						3	
				1	0.00	05	6													
			Totals	114	0.21															
89	075405	53248	808554	8	0.02	91	2												7	
				10	0.02	92	3						3							
				41	0.06	93	4						6						2	
				11	0.02	04	5						4						1	
			Totals	70	0.13															
89	075325	23396	25311	4	0.02	91	2													
				1	0.00	92	3													
				2	0.01	93	4						2							
				0	0.00	04	5													
			Totals	7	0.03															
89	075328	21029	23724	2	0.01	91	2													
				10	0.06	92	3												1	
				11	0.05	93	4						10							
				1	0.00	94	5												1	
			Totals	24	0.11															
89	075327	21101	23828	2	0.01	01	2												2	
				4	0.02	02	3						3							
				7	0.03	93	4						4						1	
				1	0.00	94	5												1	
			Totals	14	0.07															
89	075322	23413	25472	0	0.00	91	2													
				2	0.01	a2	3													
				7	0.03	93	4						3							
				2	0.01	94	5						2							
			Totals	11	0.05															
89	075323	23617	25694	0	0.00	91	2													
				1	0.00	92	3													
				0	0.00	93	4													
				0	0.00	04	5													
			Totals	1	0.00															
89	075324	23420	25480	0	0.00	91	2													
				2	0.01	92	3						2							
				11	0.05	93	4													
				0	0.00	94	5													
				3	0.01	95	6													
			Totals	16	0.07															

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## Appendix B. (cont.)

CWT Code	Year Rec.	Washington								Calif. Ocean		Canada Ocean Net &			Alaska Ocean		FWS Freshwater		NMFS Marine
		Ocean				Freshwater				Corn.	Spt.	Com.	Seine	Spt.	Corn.	Spt.	Hatch.	Trap	
		Corn.	Spt.	Net & Seine	Trawl	Spt.	Hatch.	Trap	Spawn Ground										
074848	90						1	1					3						
	91						3	3	1										
	92						2	3	2			13			8				
	93											4							
	94							2											
075403	91																		
	92						1	3				13			4				
	93						2	10	16			13							
	94								11			8		4	4				
075404	91																		
	92							1	4	2		3							
	93				2	4	2	4	1			7							
	94				2			2				17	3		6				
	95							1					1	2	2				
075405	91								1										
	92		4						3										
	93							4	1			18		4	6				
	94											3			3				
075325	91													4					
	92																		
	93																		
	94																		
075326	91													2					
	92											3			6				
	93							1											
	94																		
075327	91																		
	92																		
	93		2																
	94																		
075322	81																		
	92																		
	93							2											
	94											3							
075323	91																		
	92																		
	93																		
	94																		
075324	91																		
	92																		
	93											6	4						
	94																		
	95											3							

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## Appendix E1. (cont.)

								Oregon									
Br. Yr.	CWT cods	CWT Rel.	Total Rel.	Estimated Recoveries		Year Rec.	Age	Ocean				Freshwater					
				No.	%			Col. R. Test Net		Treaty Spawn							
								Com	Trawl	Spt	Gillnet Fishery	Spt	Hatch Trap	Subels	Ground		
90	075225	52252	1343311	1	0.00	92	2										
				5	0.01	93	3									1	
				72	0.14	94	4									12	
				18	0.03	95	5			5						4	
				0	0.00	96	6			4							
			Totals	96	0.18												
90	075226	51726	1343042	0	0.00	92	2										
				6	0.01	93	3									2	
				75	0.14	94	4									3	
				15	0.03	95	5			3						3	
				0	0.00	96	6			2							
			Totals	96	0.19												
90	075328	46268	100642	3	0.01	92	2									3	
				29	0.05	93	3									3	
				116	0.24	94	4									7	
				16	0.04	95	5									4	
				0	0.00	96	6			3							
			Totals	168	0.35												
90	075446	46461	99962	7	0.01	92	2									2	
				15	0.03	93	3									1	
				63	0.13	94	4									12	
				17	0.04	95	5			11						4	
				1	0.00	96	6			4							
			Totals		0.21												
s o	070016	46301	99225	1	0.00	92	2										
				17	0.04	93	3									1	
				91	0.19	94	4			10						6	
				24	0.05	95	5			9						4	
				1	0.00	96	6			2						1	
			Totals	134	0.28												
90	075456	51614	52236	2	0.00	92	2									1	
				16	0.03	93	3									2	
				75	0.14	94	4			2						17	
				30	0.06	95	5									6	
				0	0.00	96	6			2			3				
			Totals	123	0.24												
90	075451	52444	52706	6	0.02	92	2									2	
				30	0.08	93	3									3	
				104	0.20	94	4			5						7	
				21	0.04	95	5			17						2	
				0	0.00	96	6			2							
			Totals	163	0.31												
90	075563	26173	26451	0	0.00	92	2										
				5	0.02	93	3									3	
				26	0.10	94	4									2	
				6	0.02	95	5			8						2	
				0	0.00	96	6										
			Totals	37	0.14												
90	075601	24782	26565	1	0.00	92	2										
				11	0.04	93	3									1	
				68	0.27	94	4			7							
				18	0.07	95	5			2						3	
				0	0.00	96	6			4							
			Totals	96	0.40												

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## Appendix B (cont.)

		Washington								Calif. Ocean	Canada Ocean Net & Seine	Alaska Ocean	FWS Freshwater	NMFS Marine					
		Ocean				Freshwater													
C W T	Year	Com.	Spt.	Net & Seine	Trawl	Spt.	Hatch.	Trap	Spawn Ground										
code	Rec.									Corn.	Spt.	Com.	Seine	Spt.	Corn.	Spt.	Hatch.	Trap	
075225	92								1										
	93								1							3			
	94					3		2	2							6			
	95								2							8			
	96																		
075226	92																		
	93								4										
	94								3			13			11				
	95						1	4	42			3			2				
	96																		
075328	02																		
	03						1					6			11				
	94								12			11			14				
	95								2			3			5				
	96																		
075449	92							1	1										
	93							1	1			6			6				
	94					3			5			12		4	4				
	95								3			3			2				
	96								1										
070016	02								1										
	93		3						1						2				
	94					3		3	7			14			6	1			
	95							1	3			5			6				
	96																		
0754.50	92		1																
	93							2	2			5			1				
	94							1	9			26			10	1			
	95							2	3			10	1		2				
	96																		
075451	02								3				3						
	03		4						1			9		7	1				
	94							2	2			22			11				
	95								3			3			11				
	96																		
075563	92																		
	93								2										
	94								2			11	1		2				
	95								2						2				
	96																		
075601	02								1										
	93								1						2				
	94								4			11			8				
	95								1			0			1				
	96																		

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Appendix B. (cont.)

								Oregon									
								Ocean					Freshwater				
Br.	CWT	CWT	Total	Estimated Recoveries		Year		Col.	R.	Test	Net				Treaty	Spawn	
Yr.	code	Rel.	Rel.	No.	%	Rec.	Age	Com	Trawl	Spt	Gillnet	Fishery	Spt	Hatch	Trap	Subels	Ground
00	075502	25476	26606	2	0.01	92	2									1	
				16	0.08	93	3	4					3	1		3	
				29	0.11	94	4				6			Elk R.		4	
				10	0.04	95	5					1				2	
				0	0.00	96	6										
			Totals	57	0.22												
90	075560	25720	25862	7	0.03	92	2				6						
				8	0.02	93	3										
				18	0.07	94	4				1				4		
				13	0.05	95	5				5						
				0	0.00	96	6										
			Totals	44	0.17												
90	075561	25425	25708	1	0.00	92	2										
				17	0.07	93	3				6					2	
				15	0.06	94	4				6					1	
				7	0.03	95	5				3					1	
				0	0.00	96	6										
			Totals	40	0.16												
90	075552	22309	23285	3	0.01	92	2										
				8	0.04	93	3					3				2	
				24	0.11	94	4				2					4	
				5	0.02	95	5									2	
				0	0.00	96	6										
			Totals	40	0.18												
90	075615	28175	97801	0	0.00	93	3										
				5	0.02	94	4										
				0	0.00	95	5										
				0	0.00	96	6										
			Totals	5	0.02												
90	075618	26160	122639	0	0.00	93	3										
				1	0.00	94	4									1	
				4	0.02	95	5						4				
				0	0.00	96	6										
			Totals	5	0.02												
01	071480	23663	68492	3	0.01	93	2									3	
				1	0.00	94	3									1	
				3	0.01	95	4										
				1	0.00	96	5										
			Totals	8	0.03												
91	071461	23239	66345	3	0.01	93	2									3	
				9	0.04	94	3									4	
				0	0.00	95	4										
				0	0.00	96	5										
			Totals	12	0.05												
91	071429	31892	266578	1	0.00	94	3									1	
				0	0.00	95	4										
				0	0.00	96	5										
				1	0.00												
91	071430	32287	281350	0	0.00	94	3										
				0	0.00	95	4										
				1	0.00	96	5									1	
				1	0.00												

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## Appendix B. (cont.)

Appendix B. (Cont.)

CWT Year Coda Rec.	Washington							Calif. Ocean	Canada		Alaska		Fws Freshwater		NMFS Marine		
	Ocean			Freshwater					Corn.	Spt.	Corn.	Spt.	Corn.	Spt.		Hatch.	Trap
	Com.	Spt.	Seine	Troll	Spt.	Math.	Trap										
075602 92							1										
03							1										
84							1		11	1		4		4			
95									4								
96							3										
075560 02																	
93							1										
94							1		1			3					
95						1	5		7								
96							1				3	2	1				
075551 92																	
93														1			
94						2			9								
95							2		4			2					
96																	
075562 92				2													
93							3										
94							3							4			
95									8			3					
96																	
075618 93																	
94																	
95									5								
96																	
075619 83																	
94																	
95																	
96																	
071460 93																	
94																	
95											3						
96							1										
071451 03																	
94																	
95											4						
96																	
071429 94																	
95																	
"																	
071430 94																	
95																	
96																	

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## Appendix B. (cont.)

								Oregon									
								Ocean			Freshwater						
Br. Yr.	C W T coda	C W T Rel.	Total Rel.	Estimated Recoveries		Year Rec.	Age	Com	Trawl	Spt	Col. R. Gillnet	Test Net Fishery	Spt	Hatch	Trap	Treaty Subs	Spawn Ground
01	071431	26651	182931	0	0.00	64	3										
				0	0.00	95	4										
				0	0.00	96	5										
				0	0.00												
91	071432	22425	181257	0	0.00	94	3										
				0	0.00	95	4										
				0	0.00	96	5										
				0	0.00												
91	071433	29068	303878	0	0.00	94	3										
				0	0.00	95	4										
				0	0.00	96	5										
				0	0.00												
91	071434	31224	306802	0	0.00	94	3										
				0	0.00	95	4										
				0	0.00	96	5										
				0	0.00												
91	071435	30326	297331	0	0.00	94	3										
				0	0.00	95	4										
				0	0.00	96	5										
				0	0.00												
91	071435	30365	302555	0	0.00	94	3										
				1	0.00	95	4									1	
				0	0.00	96	5										
				1	0.00												
81	071437	30508	223630	1	0.00	94	3										
				0	0.00	95	4									1	
				0	0.00	96	5										
				1	0.00												
91	071436	30924	301631	0	0.00	94	3										
				0	0.00	95	4										
				0	0.00	96	5										
				0	0.00												
92	070125	29360	272486	6	0.02	94	2										
				10	0.03	95	3										2
				0	0.00	96	4										4
				16	0.05												
92	076329	30706	203731	1	0.00	94	2				1						
				5	0.02	65	3										
				3	0.01	96	4									2	
				9	0.03											2	
92	076330	26664	292895	3	0.01	94	2										
				2	0.01	95	3				2					2	
				2	0.01	96	4										
				7	0.02												
92	076331	26537	282125	2	0.01	94	2										
				4	0.01	95	3				1						1
				3	0.01	96	4										3
				9	0.03												

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## Appendix B. (cont.)

C W T c o d a	Year Rec.	Washington							Calif. Ocean	Canada Ocean Net & Spt.	Alaska O c e a n	FWS Freshwater	NMFS Marine
		Ocean			Freshwater								
		Com.	spt.	Seine	Troll	Spt.	Hatch.	Trap					
071431	24 95 96												
071432	94 es 96												
071433	94 95 96												
071434	94 95 96												
071435	94 95 96												
071436	94 95 96												
071437	94 95 96												
071438	94 95 96												
070125	94 95 96							1		4 5			
076329	94 95 96					1 1		1		1			
076330	94 95 96							1					
076331	94 95 96							1					

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## Appendix B. (cont.)

								Oregon											
Br. Yr.	CWT code	C W T Rel.	Total Rel.	Estimated Recoveries		Year Rec.	Age	Ocean			Freshwater								
				No.	%			Com	Trawl	Spt	Col. R. Gillnet	Test Fishery	Net Spt	Hatch	Trap	Treaty Subsals	Spawn Ground		
92	076332	29451	277931	4	0.01	94	2											4	
				3	0.01	95	3											2	
				1	0.00	96	4											1	
				8	0.03														
92	075333	29716	273662	4	0.01	94	2				1								
				5	0.02	95	3											2	
				5	0.02	96	4											3	
				14	0.05														
92	075334	29958	232175	2	0.01	94	2												2
				3	0.01	95	3											3	
				1	0.00	96	4											1	
				6	0.02														
92	075335	30462	207585	2	0.01	94	2												2
				11	0.04	95	3											7	
				2	0.01	96	4											2	
				15	0.05														
92	070127	27092	288336	0	0.00	94	2												
				9	0.03	95	3											3	
				3	0.01	96	4											3	
				12	0.04														
92	070125	29594	268001	0	0.00	94	2												
				6	0.02	95	3											6	
				3	0.01	96	4											1	
				9	0.03														
92	070252	23470	49824	15	0.06	94	2											15	
				3	0.01	95	3											2	
				1	0.00	96	4											1	
				15	0.08														
02	070255	23699	233629	34	0.14	94	2											33	
				17	0.07	95	3								7			6	
				9	0.04	96	4											9	
				60	0.25														
93	070663	31162	322867	2	0.01	95	2												2
				0	0.00	96	3												
				2	0.01														
93	070719	31658	327700	4	0.01	95	2											3	
			4		0.01	96	3											4	
				8	0.03														
93	070720	30528	314518	2	0.01	95	2											2	
				6	0.02	96	3											4	
				8	0.03														
93	070723	30447	328408	2	0.01	95	2											1	
				3	0.01	96	3											3	
				5	0.02														
93	070722	30850	303843	2	0.01	95	2											1	
				6	0.02	96	3											6	
				8	0.03														

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Appendix B, (cont.)

C W T Year coda Rec.	Washington								Calif. Ocean	Canada Ocean Net & Spt.	Alaska Ocean	FWS Freshwater	NMFS Marine
	Ocean				Freshwater								
	Net & spt.	Treaty Seine	Troll	Spt.	Hatch.	Trap	Spawn Ground						
076332	94												
	95												
	96												
076333	84				3								
	95				1	1	1		2				
	96												
076334	94												
	95												
	96												
076335	94									4			
	95												
	96												
070127	94				6								
	95												
	96												
070126	94												
	95												
	96					1	1						
070252	94												
	95							1					
	96												
070255	84					1							
	95									4			
	96												
070663	95												
	96												
070719	95							1					
	96												
070720	95							1					
	96												
070723	95							1					
	96												
070722	95					1							
	96												

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## Appendix B. (cont.)

Br. Yr.	CWT Code	CWT Rel.	Total Rel.	Ed mated Recoveries		Year Rec.	Age	Oregon									
								Ocean					Freshwater				
				No.	%			Com	Trawl	Spt	Col. R. Gillnet	Test Fishery	Not Spt	Hatch	Trap	Treaty Subs	Spawn Ground
93	070721	23474	303105	0	0.00	95	2										
				5	0.02	96	3									3	
				5	0.02												
93	070562	31230	230045	0	0.00	95	2										
				5	0.00	96	3									4	
				5	0.02												
93	070718	31040	272255	2	0.01	95	2									2	
				1	0.00	96	3									1	
				3	0.01												
93	070716	30502	191321	2	0.01	95	2										
				4	0.01	96	3									4	
				6	0.02												
93	070717	32451	190439	2	0.01	95	2									2	
				8	0.02	96	3									7	
				10	0.03												
93	070858	24865	111817	47	0.19	95	2									47	
				5	0.02	96	3									5	
				52	0.21												
93	070550	24374	115271	27	0.11	95	2									27	
				0	0.00	96	3										
				27	0.11												
04	071023	28623	287313	0	0.00	96	2										
94	071025	22784	274110	0	0.03	96	2										
94	071017	20735	271129	0	0.00	96	2										
24	071015	29132	241342	0	0.00	96	2										
94	07101s	28353	286459	0	0.00	96	2										
a4	071020	29460	275813	0	0.00	96	2										
94	071021	29327	152098	0	0.00	96	2										
94	071022	28472	230406	0	0.00	96	2										
94	071024	30204	151943	0	0.00	96	2										
94	071026	30106	245885	0	0.00	96	2										
94	071038	25521	217224	18	0.08	96	2									18	
a4	071039	23233	48499	1	0.00	96	2									1	
94	071040	23442	47433	5	0.00	96	2									5	
94	071041	23343	47125	10	0.01	96	2									10	
94	071037	27327	204022	47	0.17	96	2									47	

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## Appendix B. (cont.)

		Washington								Calif. Ocean		Canada Ocean Net & Seine			Alaska Ocean		FWS Freshwater		NMFS Marine
CWT Code	Year' Rec.	Ocean				Freshwater				Corn.	Spt.	Com.	Seine	Spt.	Corn.	Spt.	Hatch.	Trap	
		Net & Seine	Trawl	Spt.	Hatch.	Trap	Spawn Ground												
070721	95						1		1										
	96																		
070562	95																		
	96								1										
070715	95																		
	96																		
070716	95													2					
	96																		
070717	95																		
	96						1												
070558	95																		
	96																		
070559	95																		
	96																		
071023	96																		
071025	96																		
071017	96																		
071018	96																		
071019	96																		
071020	96																		
071021	96																		
071022	96																		
071024	96																		
071026	96																		
071038	96																		
071039	96																		
071040	96																		
071041	96																		
071037	96																		

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Appendix C. Uperatbn and survival informatbn for spring chinook salmon released in the Umatilla River.

Brood	CWT Code	CWT Released	Total Released	Estimated Recoveries		Year Recov.	Age at Recov.	Oregon			
				Number	%			Hatchery/Trap/Spawn Ground	S	Cd. R. p o r t	Cd. R. Gillnet
							6				
86	074325	26640	35946	3	0.011	88	2		2		
				8	0.030	69	3		Boon.		
				177	0.664	90	4			1	2
				65	0.244	91	5				2
				Totals	253	0.950					
66	074328	25663	35146	0	0.060	06	2				
				4	0.015	69	3				
				173	0.669	90	4			26	3
				67	0.259	91	5			13	6
				Totals	244	0.943					
86	074327	25853	35137	0	0.000	88	2				
				4	0.015	89	3				
				166	0.642	90	4				
				74	0.286	91	5				
				Totals	244	0.944					
86	074326	26319	64142	1	0.004	88	2		1		
				6	0.023	69	3		Boon.		
				125	0.475	90	4		2		
				40	0.152	91	5		1 Boon.		
				Totals	172	0.654			1 LO		
86	074329	25722	62991	2	0.008	88	2		2		
				4	0.016	89	3		Boon.		
				80	0.311	90	4		2		
				36	0.148	91	5		1 LO	1	4
				Totals	124	0.462			1 Hella Canyon Dam trap		
86	074330	26252	64013	0	0.000	88	2				
				0	0.000	89	3				
				169	0.644	90	4			1	
				72	0.274	91	5			12	
				Totals	241	0.918					
87	0744 20	410	416	0	0.000	09	2				
				0	0.000	90	3				
				0	0.000	91	4				
				Totals	0	0.000					
87	074423	393	399	0	0.000	69	2				
				0	0.000	90	3				
				1	0.254	91	4				
				Totals	1	0.254					
07	074424	376	361	0	0.000	69	2				
				0	0.000	90	3				
				1	0.266	91	4				
				Totals	1	0.266					

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## Appendix C (cont)

CWT Code	Year Recov.	Oregon					Wash.		Wash./Idaho	Alaska/ Calif.
		Test Net Fishery/f	Indian Ceremonial	/1	Umatilla R. Fish Trap	Uma. R. Spawn Surveys/Sport	Sport	Treaty Troll	Hatchery/Trap/ Spawn Ground	Ocean Comm.
074325	88								1	
	89				8				Cowlitz	
	90			11	15	148				
	91			6	2	55				
074326	88									
	89				4					
	90			12	15	114	3	Freshwater		
	91	1		8	10	29		42001 R67		
074327	88									
	89				4					
	90	1		17	9	125			7	
	91			6	8	59			Tucannon	
074328	66									
	89				6					
	90	1		11	0	102				
	91	1		6	12	21				
074329	66									
	89				4					
	90			15	16	46			1	
	91	1		9	10	13			IDFG Hatch. 4F - 1706030503600.00	
074330	88									
	89									
	90	2		11	17	137			1	
	91	1		11	14	34			IDFG Hatch. 4F - 1706020106901.25	
074420	89									
	90									
	91									
074423	89									
	90									
	91									
074424	89									
	00									
	91				1					

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## Appendix C (cont)

Brood	CWT Code	CWT Released	Total Released	Estimated Recoveries		Year Recov.	Age at Recov.	Oregon		
				Number	%			Hatchery/Trap/	Cd. R.	Col. R.
								Spawn Ground	S p o r t	Gillnet
87	074427	25987	26109	0	0.000	89	2			
				0	0.000	so	3			
				15	0.058	91	4			
			Totals	15	0.058					
87	074429	24070	24183	0	0.000	89	2			
				2	0.008	so	3			
				21	0.007	91	4			
				5	0.021	92	5			
			Totals	28	0.116					
07	0744 30	25366	25475	0	0.000	89	2			
				0	0.000	90	3			
				21	0.003	91	4			
				1	0.004	92	5			
			Totals	22	0.007					
87	074433	25427	26135	0	0.000	89	2			
				5	0.020	90	3			
				85	0.334	91	4			
				0	0.000	92	5			
			Totals	90	0.354					
87	074434	27004	27756	0	0.000	89	2			
				2	0.007	so	3			
				57	0.211	91	4			
				8	0.030	92	5			
			Totals	67	0.248					
87	074436	25386	26093	0	0.000	89	2			
				3	0.012	90	3			
				54	0.213	91	4			
				8	0.032	92	5			
			Totals	65	0.256					
a7	074439	27585	28153	1	0.004	89	2			
				0	0.000	90	3			
				76	0.276	91	4			
				12	0.044	92	5			
			Totals	89	0.323					
07	074440	27550	26116	0	0.000	89	2			
				3	0.011	90	3			
				04	0.305	91	4			
				5	0.018	92	5			
			Totals	92	0.334					
87	0744 43	24165	24663	2	0.008	89	2			
				2	0.000	90	3			
				74	0.306	91	4			
				7	0.029	92	5			
			Totals	85	0.352					

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## Appendix C (cont.)

CWT Code	Year Recov.	Oregon						Wash.		Wash./Idaho	Alaska/ Calif.
		Test Fishery	Net /1	Indian Ceremonial	/1	Umatilh Fish Trap	A. Uma. R. Surveys/Sport	Sport	Treaty Troll	Hatchery/Trap/ Spawn Ground	Ocean Comm.
074427	89										
	90										
	91					7		8			
074429	00										
	90						2				
	91				3		5	13			
	92							5			
074430	89										
	90										
	91					8		13			
	92					1					
074433	00										
	90						5				
	91				11	19		55			
	92										
074434	00										
	90						2				
	91				9	23		25			
	92					3		5			
074436	00										
	90						3				
	91		1		11	13		29			
	92				2	1		5			
074439	89										
	90										
	91		1		10	23		42			
	92				2						
074440	89										
	90						2	1			
	91		1		11	30		42			
	92				2		1		2 Ocean		
074443	89										
	90						2				
	91		2		11	19		42			
	92					2		5			

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## Appendix C (oont)

Brood	CWT Code	CWT Released	Total Released	Estimated Recoveries		Year Recov.	Age at Recov.	Oregon		
				Number	%			Hatchery/Trap/Spawn Ground	S	Cd. R Gillnet
88	075063	24601	24968	1	0.004	90	2		1	Bonn.
				2	0.008	91	3		1	Bonn.
				9	0.036	92	4		1	Pekoa Dam trap
				5	0.020	93	5			
			Totals	17	0.069					
88	075101	28109	28299	1	0.004	90	2			
				0	0.000	91	3			
				12	0.043	92	4		2	Pekoa Dam trap
				22	0.078	93	5			
			Totals	35	0.125					
88	075102	27299	27483	1	0.004	90	2		1	Bonn.
				2	0.007	91	3			
				10	0.037	92	4			
				12	0.044	93	5			
			Totals	25	0.092					
88	075103	27137	27287	2	0.067	91	3			
				8	0.022	92	4			
				10	0.037	93	5			
			Totals	18	0.066					
88	075104	28580	28718	5	0.018	91	3			
				18	0.063	92	4			7
				9	0.032	93	5			
			Totals	32	0.112					
88	075105	27895	27848	1	0.004	91	3			
				4	0.014	92	4			
				8	0.029	93	5			
			Totals	13	0.047					
88	075106	28638	38224	3	0.011	90	2		1	Bonn.
				2	0.008	91	3			
				67	0.252	92	4			2
				58	0.218	93	5			
			Totals	130	0.488					
88	075107	28166	37538	1	0.004	91	3			
				86	0.329	92	4			10
				83	0.317	93	5			
			Totals	170	0.850					
88	075108	26888	38583	0	0.000	91	3			
				58	0.218	92	4		1	
				70	0.260	93	5	Snake R. spawn ground		16
			Totals	128	0.476					

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## Appendix C (cont.)

CWT Code	Year Recov.	Oregon					Wash.		Wash./Idaho	Alaska/ Calif. Ocean Comm.
		Test Net Fishery /1	Indian Ceremonial /1	Umatil R. Fish Trap	Uma. R. R. Surveys/Sport	Spawn	Sport	Treaty Troll	Hatchery/Trap/ Spawn Ground	
075063	91				1					
	92	1	2	2					3	
	93		2	1		2			Tucannon R. Spawn Ground	
075101	90								1	
	91								Dwornhak Hatch.	
	92			4		5			1	
	93			2		20			Dwornhak Hatch.	
075102	90									
	91			2						
	92		4	6						
	93			2		10				
075103	91			2						
	92			6						
	93		2			8				
075104	91			5						
	92		7	4						
	93		2	1		6				
075105	91			1						
	92			4						
	93					8				
075106	90								2	
	91			2					Dwornhak Hatch.	
	92	1	13	26		23				
	93		7	5		46				
075107	91			1						
	92		17	22		32			5	
	93		9	4		70			1 Tucannon Hatch. 1 Dwornhak Hatch. 3 Tucannon River Spawn Ground	
075106	91									
	92		7	24		9			1	
	93		9	7		54			Chewack R. gaff	

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## Appendix C (cont.)

Brood	CWT Code	CWT Released	Total Released	Estimated Recoveries		Year Recov.	Age at Recov.	Oregon		
				Number	%			Hatchery/Trap/	C d .	R. Col. R. Gillnet
								Spawn Ground	S p o r t	
<b>88</b>	075109	25811	<b>39012</b>	3	0.012	90	2		<b>2</b>	
				2	<b>0.008</b>	91	3		<b>Bonn.</b>	
				73	0.285	92	4			<b>20</b>
				108	<u>0.422</u>	93	5		<b>1</b>	
									<b>LO</b>	
			Totals	186	0.726					
<b>88</b>	075110	26307	40072	8	0.023	91	3			
				87	0.331	92	4			
				105	<u>0.399</u>	93	5			<b>9</b>
										<b>5</b>
			<b>Totals</b>	198	0.753					
<b>88</b>	075111	25172	38343	2	0.008	90	2			
				3	0.012	91	3			
				54	0.215	92	4			<b>2</b>
				77	<u>0.208</u>	93	5			<b>3</b>
			Totals	136	0.540					
89	075114	25947	33473	0	0.000	92	3			
				59	0.227	93	4			
				5	<u>0.019</u>	94	5		<b>1</b>	<b>5</b>
								<b>Walla Walla</b>		
			Totals	84	0.247					
89	075115	25921	33440	2	0.008	92	3			
				45	0.174	93	4			
				9	<u>0.035</u>	94	5			
			Totals	56	0.218					
89	075118	28039	33593	0	0.000	92	3			
				82	0.238	93	4			
				3	<u>0.012</u>	94	5			
			Totals	65	0.250					
89	075440	24365	31932	30	0.123	93	4			
				3	0.012	94	5			
				3	<u>0.012</u>	95	8			
			Totals	36	0.148					
89	075441	24559	32187	34	0.138	93	<b>4</b>			
				18	<u>0.065</u>	94	<b>5</b>			<b>5</b>
			Totals	50	0.204					
89	075442	2444 1	32032	32	0.131	93	<b>4</b>			
				12	<u>0.049</u>	94	<b>5</b>			
			Totals	44	0.180					
89	074505	26670	26757	3	0.011	93	<b>4</b>			
				0	<u>0.000</u>	94	<b>5</b>			
			Totals	3	0.011					
89	074506	26717	28805	2	0.007	93	<b>4</b>			
				0	<u>0.000</u>	94	<b>5</b>			
			Totals	2	0.007					

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## Appendix C (cont)

Appendix C (cont.)

CWT Code	Year Recov.	Oregon				Wash.	Wash./Idaho	Alaska/ Calif.	
		Test Net Fishery /1	Indian Ceremonial /1	Umatilh R. Fish Trap	Uma. R. Spawn Surveys/Sport	Sport	Treaty Troll	Hatchery/Trap/ Spawn Ground	Ocean Comm.
075109	90							1	
	91			2				Dworschak Hatch.	
	92		7	31	4			1	
	93	1	7	11	88			Chinawa R. Spaw Ground	
075110	91			6				1 Dworschak H. 1 Nason Cr. Spaw Gr.	
	92	2	22	24	27		1	2	
	93		13	10	76			1	
								Tucannon Hatch.	
075111	90							2	
	91			3				Dworschak Hatch.	
	92	1	11	22	9			9	
	93		11	5	59			1 Kooskia Hatch. 1 Leavenworth Hatch. 1 Dworschak Hatch. 1 Wells Dam sp. ch.	
075114	92							3 Tuc. R. Spaw Gr.	
	93		9	12	32			1 Nason Cr. Spaw Gr.	
	94			2	3			1 Icicle Cr. Spaw Gr.	
075115	92			2					
	93		5	14	26				
	94			1	8				
075116	92								
	93		5	29	28				
	94				3				
075440	93			12	18				
	94				3				
	95				3				
075441	93			17	14				
	94				11				3
075442	93		5	13	14				
	94			1	11				
074505	93			1	2				
	94								
074506	93				2				
	94								

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## Appendix C (cont.)

Brood	CWT Code	CWT Released	Total Released	Estimated Recoveries		Year Recov.	Age at Recov.	Oregon			
				Number	%			Hatchery/Trap/Spawn	Ground	Cd. R Sport	Col. R Gillnet
89	074507	26706	26676	0	0.000	93	4				
				0	0.000	94	5				
			Totals	0	0.000						
89	074508	25676	26050	2	0.008	93	4				
				0	0.000	94	5				
			Totals	2	0.008						
89	074509	26104	26279	0	0.000	93	4				
				0	0.000	94	5				
			Totals	0	0.000						
89	0745 10	25497	25669	2	0.008	93	4				
				0	0.000	94	5				
			Totals	2	0.008						
89	636661	23797	96733	146	0.614	93	4				
				15	0.063	94	5				4
			Totals	161	0.677						
90	075826	26769	27040	3	0.011	93	3				
				19	0.071	94	4				
			Totals	22	0.082						
90	075627	26737	27007	4	0.015	93	3				
				12	0.045	94	4				
			Totals	16	0.060						
90	075826	26627	27098	2	0.007	93	3				
				21	0.078	94	4				
				3	0.011	95	5				
			Totals	26	0.097						
90	075829	25499	26019	0	0.000	93	3				
				12	0.047	94	4				
			Totals	12	0.047						
90	075630	25362	25900	1	0.004	93	3				
				12	0.047	94	4				
				3	0.012	95	5				
			Totals	16	0.063						
90	075831	26029	2656 1	1	0.004	93	3				
				10	0.038	94	4				
			Totals	11	0.042						
90	075035	26570	3635 1	1	0.004	93	3				
				5	0.019	94	4				
			Totals	6	0.023						

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## Appendix C (cont)

CWT Code	Year Recov.	Oregon					Wash.		Wash./Idaho	Alaska/ Calif.
		Test Fishery	Net /1	Indian Ceremonial /1	Umatilla R. Fish Trap	Uma. R. Spawn Surveys/Sport	Sport	Treaty Troll	Hatchery/Trap/ Spawn Ground	Ocean Comm.
074507	93 94									
074506	93 94									
074509	93 94									
074510	93 94					2				
635661	93 94	1		16	6	14 3	94 6		15 2	
075626	93 94				3 2	17				
075627	93 94				3 1	1 11				
075626	93 94 95				1 4	1 17 3				
075629	93 94				1	11				
075630	93 94 95				1 4	8 3				
075631	93 94				1 2	8				
075635	93 94			2		1 3				

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## Appendix C (cont.)

Brood	CWT Code	CWT Released	Total Released	Estimated Recoveries		Year Recov.	Age at Recov.	Oregon			
				Number	%			Hatchery/Trap/Spawn	Ground	Sport	Cd. R. Gillnet
90	075636	26426	36154	0	0.000	93	3				
				5	0.019	94	4				
				Totals	5	0.019					
90	075637	26750	36596	0	0.000	93	3				
				6	0.022	94	4				
				5	0.019	95	5				
				Totals	11	0.041					
90	075632	25503	32994	0	0.000	93	3				
				4	0.016	94	4				
				3	0.012	95	5				
				Totals	7	0.027					
90	075833	25472	32953	1	0.004	93	3				
				9	0.035	94	4			5	
				Totals	10	0.039					
90	075634	25493	32982	2	0.008	93	3				
				1	0.004	94	4				
				Totals	3	0.012					
90	633962	31651	96254	0	0.000	94	4				
91	071443	50611	97013	0	0.000	94	3				
				0	0.000	95	4				
				0	0.000	96	5				
				Totals	0	0.000					
91	071444	46051	63565	0	0.000	94	3				
				0	0.000	95	4				
				0	0.000	96	5				
				Totals	0	0.000					
91	071445	49498	63305	0	0.000	94	3				
				0	0.000	95	4				
				0	0.000	96	5				
				Totals	0	0.000					
91	071446	50045	95456	0	0.000	94	3				
				0	0.000	95	4				
				0	0.000	96	5				
				Totals	0	0.000					
91	071447	50047	104670	0	0.000	94	3				
				0	0.000	95	4				
				0	0.000	96	5				
				Totals	0	0.000					

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## Appendix C (cont.)

CWT Code	Year Recov.	Oregon					Wash.		Wash./Idaho	Alaska/ Calif.
		Test Net	Indian	Umatilla R.	Uma. R. Spawn		Treaty	Hatchery/Trap/	Ocean	
		Fishery /1	Ceremonial	It	Fish Trap	Surveys/Sport	Sport	Troll	Spawn Ground	Comm.
075636	93									
	94				2	3				
075637	93									
	94					6				
	95					5				
075632	93									
	94		1			3				
	95					3				
075633	93				1					
	94				1	3				
075834	93				2					
	94				1					
633962	94									
071443	94									
	95									
	96									
071444	94									
	95									
	96									
071445	94									
	95									
	96									
071446	94									
	95									
	96									
071447	94									
	95									
	96									

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## Appendix C (cont)

Brood	CWT Code	CWT Released	Total Released	Estimated Recoveries		Year Recov.	Age at Recov.	Oregon		
				Number	%			Hatchery/Trap/Spawn Ground	Cd. R. S p o r t	Cd. R. Gillnet
91	071446	51707	104929	0	0.000	94	3			
				0	0.000	95	4			
				0	0.000	96	5			
				Totals	0	0.000				
91	071449	51518	109526	0	0.000	94	3			
				0	0.000	95	4			
				0	0.000	96	5			
				Totals	0	0.000				
91	071450	51271	109997	0	0.000	94	3			
				0	0.000	95	4			
				0	0.000	96	5			
				Totals	0	0.000				
91	071451	52128	96617	0	0.000	94	3			
				0	0.000	95	4			
				0	0.000	96	5			
				Totals	0	0.000				
91	071452	51659	106652	0	0.000	94	3			
				0	0.000	95	4			
				0	0.000	96	5			
				Totals	0	0.000				
91	076042	25104	25104	0	0.000	94	3			
				15	0.060	95	4			
				0	0.000	96	5			
				Totals	15	0.060				
91	076043	24992	25075	1	0.004	94	3			
				8	0.032	95	4			
				3	0.012	96	5			
				12	0.046					
91	076044	15423	15730	0	0.000	94	3			
				5	0.032	95	4			
				0	0.000	96	5			
				5	0.032					
91	076045	24636	24636	1	0.004	94	3			
				2	0.032	95	4			
				3	0.012	96	5			
				12	0.049					
91	076046	24221	24715	1	0.004	94	3			
				19	0.076	95	4			
				0	0.000	96	5			
				20	0.083					

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## Appendix C (cont)

CWT Code	Y e a r Recov.	Oregon				Wash.		Wash./Idaho	Alaska/ Calif.
		Test Net Fishery /1	Indian Ceremonial /1	Umatilla R. Fish Trap	Uma. R. Spawn Surveys/Sport	Sport	Treaty Troll	Hatchery/Trap/ Spawn Ground	Ocean Comm.
071448	94								
	95								
	96								
071449	94								
	95								
	96								
071460	94								
	95								
	96								
071451	94								
	95								
	96								
071452	94								
	95								
	96								
076042	94								
	95								
	96								
076043	94								
	95		3						
	96								
076044	94								
	95								
	96								
076045	94								
	95								
	96								
076046	94				1				
	95								
	96					19			

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## Appendix C (cont.)

Brood	CWT Code	CWT Released	Total Released	Estimated Recoveries		Year Recov.	Age at Recov.	Oregon		
				Number	%			Hatchery/Trap/Spawn	Cot. R Ground Sport	Cd. R Gillnet
91	076047	17269	17667	0	0.000	94	3			
				8	0.046	95	4			
				0	0.000	96	5			
				6	0.046					
91	071542	26135	50736	0	0.000	94	3			
				0	Aooo	95	4			
				0	0.000	98	5			
				0	0.000					
91	071543	25633	50680	0	0.000	94	3			
				0	0.000	95	4			
				3	0.012	96	5			
				3	0.012					
91	071455	19951	92728	1	0.005	94	3			
				36	0.190	95	4			
				6	0.030	96	5			
				45	0.226					
91	071456	20022	94220	0	0.000	94	3			
				27	0.135	95	4			
				6	0.030	96	5			
				33	0.165					
91	075739	21499	50310	0	0.000	94	3			
				0	0.000	95	4			
				3	0.014	96	5			
				3	0.014					
91	075740	20660	50109	0	0.000	94	3			
				3	0.014	95	4			
				0	0.000	96	5			
				3	0.014					
91	075741	21157	54347	0	0.000	94	3			
				16	0.076	95	4			
				0	0.000	96	5			
				16	0.076					
91	075742	20307	54016	0	0.000	94	3			
				8	0.039	95	4			
				0	0.000	96	6			
				8	0.039					
91	635950	31421	96086	0	0.000	94	3			
				0	0.000	95	4			
				0	0.000	96	5			
				0	0.000					

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## Appendix C (cont.)

CWT Code	Year Recov.	Oregon				Wash.	Wash./Idaho	Alaska/ Calif.
		Test Net Fishery/I	Indian Ceremonial	Umatilla R. Fish Trap	Uma. R. Spawn Surveys/Sport	Treaty Troll	Hatchery/Trap/ Spawn Ground	Ocean Comm.
079047	94 95 96				8			
071542	94 95 96							
071543	94 95 96				3			
071455	94 95 96		3		35 6			
071456	94 95 96		3		24 6			
075739	94 95 96				3			
075740	94 95 96				3			
075741	94 95 96				16			
075742	95 96				8			
635950	94 95 96							

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## Appendix C (cont)

Brood	CWT Code	CWT Released	Total Released	Estimated Recweree		Year Recov.	Age at Recov.	Oregon			
				Number	%			Hatchery/Trap/Spawn	Ground	C o t . R	Col. R Gillnet
92	076136	52566	105290	0	0.000	95	3				
				0	0.000	96	4				
				0	0.000						
92	076135	51660	109473	0	0.000	95	3				
				0	0.000	96	4				
				0	0.000						
92	076132	52693	113652	0	0.000	95	3				
				0	0.000	96	4				
				0	0.000						
92	076137	52172	111103	0	0.000	95	3				
				0	0.000	96	4				
				0	0.000						
92	076134	51963	111333	0	0.000	95	3				
				0	0.000	96	4				
				0	0.000						
92	076133	52335	116316	0	0.000	95	3				
				0	0.000	96	4				
				0	0.000						
92	070159	3454 1	49694	0	0.000	95	3				
				3	0.009	96	4				
				3	0.009						
92	070161	35657	52211	0	0.000	95	3				
				0	0.000	96	4				
				0	0.000						
92	070216	36102	47667	1	0.003	95	3				
				3	0.008	96	4				
				4	0.011						
92	070160	35406	4906 1	0	0.000	95	3				
				3	0.008	96	4				
				3	0.006						
92	070162	35467	46343	0	0.000	95	3				
				10	0.026	96	4				
				10	0.026						
92	070163	36157	49318	0	0.000	95	3				
				0	0.000	96	4				
				0	0.000						

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## Appendix C (wnt)

CWT Code	Year Recov.	Oregon					Wash.		Wash./Idaho	Alaska/ Calif.
		Test Fishery	Net /1 Ceremonial	Indian /1	Umatilla Fish Trap	Ft. Surveys/Sport	Uma. A. Spawn	Treaty Troll	Hatchery/Trap/ Spawn Ground	Ocean Comm.
076136	95 96									
076135	95 96									
076132	95 96									
076137	95 96									
076134	95 96									
076133	95 96									
070159	95 96						3			
070161	95 96									
0702 16	95 96						3			
070160	95 96						3			
070162	95 96						10			
070163	95 96									
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## Appendix C (cont.)

Brood	CWT Code	CWT Released	Total Released	Estimated Recoveries		Year Recov.	Age at Recov.	Hatchery/Trap/ Spawn Ground	Oregon Cd. R. sport	Cd. R. Gillnet
				Number	%					
92	070155	35710	40661	0	0.000	95	3			
				3	0.000	96	4			
				3	0.008					
92	070157	34857	39656	0	0.000	95	3			
				0	0.000	96	4			
				0	0.000					
92	070156	33999	42734	0	0.000	95	3			
				0	0.000	96	4			
				0	0.000					
92	070158	31430	41244	0	0.000	95	3			
				3	0.010	96	4			
				3	0.010					
92	070220	20982	51938	0	0.000	95	3			
				23	0.110	96	4			
				23	0.110					
92	070219	20971	52620	0	0.000	95	3			
				10	0.048	96	4			
				10	0.048					
92	070217	20070	51210	0	0.000	95	3			
				0	0.000	96	4			
				0	0.000					
92	070218	19920	49375	0	0.000	95	3			
				16	0.080	96	4			
				16	0.080					
92	070251	26305	75635	1	0.004	94		1 Boon.		
				6	0.023	95	3			
				130	0.494	96	4			
				137	0.521					
92	070256	26716	77019	5	0.019	95	3			
				135	0.505	96	4			
				140	0.524					
92	075945	20219	130925	4	0.020	95	3			
				77	0.381	96	4			
				81	0.401					
92	075944	20109	130213	2	0.010	95	3			
				110	0.547	96	4			
				112	0.557					

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## Appendix C (cont)

CWT Code	Year Recov.	Oregon					Wash.		Wash./Idaho	Alaska/ Calif.
		Test Net Fishery /1	Ceremonial	Indian /1	Umatilla R. Fish Trap	Uma. R. Spawn Surveys/Sport	Sport	Treaty Troll	Hatchery/Trap/ Spawn Ground	Ocean Comm.
070155	95 96					3				
070157	95 96									
070156	95 96									
070156	95 96					3				
070220	95 96					23				
070219	95 96					10				
070217	95 96									
070218	95 96					16				
070251	94 95 96				6 3	125			2 1 Tucannon Hatch. 1 Chiwawa spawn ground	
070250	95 96				5	135				
075945	95 96				3	7 7	1 1 White Salmon			
075944	95 96				2 3	106			1 1 Methow Hatchery	

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## Appendix C (cont.)

Brood	CWT Code	CWT Released	Total Released	Estimated Recoveries		Year Recov.	Age at Recov.	Oregon		
				Number	%			Hatchery/Trap/Spawn Ground	Col. R. S p o r t	Col. R. Gillnet
93	070734	49726	140591	0	0.000	96	3			
93	070735	52298	141801	0	0.000	96	3			
93	070736	52635	139717	0	0.000	96	3			
93	070737	53172	142513	0	0.000	96	3			
93	070738	51042	139667	0	0.000	96	3			
93	070739	52317	134968	0	0.000	96	3			
93	070726	34808	36234	1	0.003	96	3			
93	070726	35156	39551	1	0.003	95	2			
				1	0.003	96	3			
				2	0.006					
93	070724	34124	39548	3	0.009	96	3			
93	070729	35160	40363	1	0.003	96	3			
93	070727	34619	39467	1	0.003	95	2			
				0	0.000	96	3			
				1	0.003					
93	070725	34627	39517	1	0.003	95	2			
				4	0.011	96	3			
				5	0.014					
93	070731	35700	37096	3	0.006	96	3			
93	070733	34220	34649	4	0.012	96	3			
93	070730	34915	37073	1	0.003	95	2			
				4	0.011	96	3			
				5	0.014					
93	070732	32251	32667	2	0.006	96	3			
93	070651	16664	49001	0	0.000	96	3			
93	070652	19052	44077	0	0.000	96	3			
93	070654	19091	47646	1	0.005	95	2			
				0	0.000	96	3			
				1	0.005					
93	070653	18175	44188	2	0.011	95	2			
				4	0.022	96	3			
				6	0.033					
93	071453	20315	50007	1	0.005	95	2			
				0	0.000	96	3			
				1	0.005					

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## Appendix C (cont.)

CWT Code	Year Recov.	Test Net Fishery /1	Indian Ceremonial /1	Oregon		Uma. R. Spaw Surveys/Sport	Sport	Wash. Treaty Troll	Wash./Idaho Hatchery/Trap/ Spawn Ground	Alaska/ Calif. Ocean Comm.
				Umatilla R. Fish Trap						
070734	96									
070735	96									
070736	96									
070737	96									
070730	96									
070739	96									
070726	96					1				
070726	95					1				
	96					1				
070724	96					3				
070729	96					1				
070727	95					1				
	96									
070725	95					1				
	96					4				
070731	96					3				
070733	96					4				
070730	95					1				
	96					3	1			
070732	96					1	1			
070651	96									
070652	96									
070654	95									
	96									
070653	95					2				
	96					4				
071453	95					1				
	96									

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Appendix C (cont)

Brood	CWT Code	CWT Released	Total Released	Estimated Recoveries		Year Recov.	Age at Recov.	Oregon		
				Number	%			Hatchery/Trap/Spawn Ground	C o l . R S p o r t	cot. R Gillnet
93	071454	15661	40665	<del>1</del> <b>1</b>	<b>0.006</b>	96	3			
93	070649	<del>22189</del>	123257	<del>5</del> <b>5</b>	0.005 <b>0.023</b>	95 96	<del>3</del> <b>3</b>		1 LODT	
				6	0.027					
93	070650	24066	124614	<del>0</del> <b>11</b>	<b>0.000</b> <b>0.046</b>	95	<del>2</del> <b>3</b>			
				<del>11</del> <b>4</b>	0.046					
93	070660	23607	74735	<del>4</del> <b>4</b>	0.017 <b>0.017</b>	95 96	3		2 LODT	
				6	0.034					
93	070661	29765	74921	3 <b>3</b>	0.010 <b>0.010</b>	95 96	<del>3</del> <b>3</b>		2 LODT	
				6	0.020					
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/1Columbia River.

Appendix C (cont.)

CWT Code	Year Recov.	Oregon						Wash.		Wash./Idaho		Alaska/ Calif. Ocean Comm.
		Test Fishery	Net /1	Indian Ceremonial	II	Umatilla R. Fish	Trap	Uma. A. Spawn Surveys/Sport	Sport	Treaty Troll	Hatchery/Trap/ Spawn Ground	
071454	96						1					
070649	95						5					
070650	95 96						11					
070660	95						2					3
070661	95 96						1 3					

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Appendix D. Liberation and survival information for coho salmon released in the Umatilla River, /a

Code	CWT C O &	CWT Released	Total Released	Estimated Recoveries		Year Recov.	Age	Oregon							Uma.R.
				No.	%			Ocean		Freshwater					
								Comm.	Sport	Col.R. Gillnet	Test Net Fishery	Sport	Hatch.	Uma.R.	
85	073817	13440	212266	1	0.01	87	2	83	20	78	1	14	1 Case	15	
				280	1.93	88	3						2 Case		
				Total	281	1.94									
85	073824	18879	313961	0	0.00	87	2	96	52	82		27	6 Case	10	
				333	1.60	88	3								
				Total	333	1.68									
85	073825	26740	422322	0	0.00	87	2	160	40	100		17	4 Case	12	
				415	1.55	88	3						1 Born.		
				Total	415	1.55									
86	074358	20592	334038	44	0.21	88	2	204	128	16			7 Case	28	
				918	4.48	89	3						1 Trunk		147
				Total	962	4.87									
86	074357	18963	380689	32	0.17	88	2	208	116	128		3	2 Case	32	
				810	4.27	89	3						1 Rork Cr		170
				Total	842	4.44									
86	074358	18513	301706	28	0.15	88	2	191	129	117	1	6	7 Case	28	
				801	4.33	89	3						1 Born.		168
				Total	829	4.48									
87	074809	27082	829607	10	0.04	89	2	32	24	1		32	4 Case	10	
				143	0.53	90	3								9
				Total	153	0.57									
87	074810	26416	72827	18	0.07	89	2	24	68	24	1		7 Case	18	
				257	0.97	90	3						1 Born.		19
				Total	275	1.04									
87	074611	26739	84672	22	0.08	89	2	57	2	16			11 Case	20	
				268	1.00	90	3						1 Born.		18
				Total	290	1.08									
88	074814	28033	67309	36	0.13	90	2	130	3	5	2	37	6 Case	16	
				828	2.85	91	3						30 Case		65
				Total	862	3.07									
88	074813	26881	856524	49	0.13	90	2	104	130	18		48	5 Case	25	
				786	2.82	91	3						17 Case		47
				Total	835	3.11									
88	074815	27228	65085	43	0.18	90	2	163	146	3	3	99	8 Case	28	
				1056	3.88	91	3						49 Case		66
				Total	1099	4.04									
89	075535	24584	152974	4	0.02	91	2		15	6				4	
				45	0.18	92	3								2
				Total	49	0.20									
89	075534	25338	449678	7	0.03	91	2		13	10		4	1 Case	6	
				3	0.14	92	3						2 Case		2
				Total	42	0.17									

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## Appendix D. (cont.)

CWT Code	Year Recov.	Washington							California Ocean		Canada Ocean			FWS Hatch.
		Ocean				FW			Comm.	Spt.	Comm.	Spt.	Net & Seine	
		Comm.	Spt.	Net & Seine	Treaty Troll	Buoy 10	Hatch.	Spt.						
073617	87 88		6			27			4	7		6		
073624	87 88		5			15			13	17		10		
073625	87 88					27	1	10	10	7		16		
074356	88 89	11	52	4	18	56	1	1	20	30	38	23	9	
074357	88 89	6	44		16	57			8	12	31	9		
074352	88 89	19	52		22	42		1	11	17	11		6	
074600	89 90		4			8			12	12				
074610	89 90	2	33		3	11			35	21	8			
074311	89 90	37	29		5	6			28	18	7			
074814	90 91	28	31			3 105			14	48			3	1 Kalamia R. Spenn
074313	90 91	10	24			1 116			32	34	18			
074815	90 91	18	2 36			a4		40	49	49	7			
075535	91 92	2	13			7								
075534	91 92		4											

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## Appendix D.(Cont.)

Appendix C (Cont.)								Oregon								
								Ocean		Freshwater						
								Comm.	Sport	Gillnet	R Test Net		Hatch.	Uma.R.		
											Fishery	Spat				
Brood code	CWT Released	CWT Released	Total Released	Estimated Recoveries NO.	%	Year Recov.	Age									
89	075533	25407	352077	2	0.01	91	2						2			
				38	0.15	92	3	3	8	4	1		10			
				Total	40	0.16										
90	075820	27908	472221	2	0.01	92	2						2			
				197	0.71	93	3	2	29	48		20	14	28 con 14 Case	43	
				Total	199	0.71										
90	075621	27705	244815	1	0.00	92	2						1			
				296	1.07	93	3	1	4	0	71	4	10	19	38 con 14 Case	72
				Total	297	1.07										
90	075622	27458	244550	3	0.01	92	2						3			
				204	0.74	93	3	1	4	9	65		8	16	18 con 15 Case	43
				Total	207	0.75										
91	071521	28273	454784	2	0.01	93	2			2						
				54	0.19	94	3			8			5	3	Case	36
				Total	56	0.20										
91	071522	27021	218818	2	0.01	93	2						2			
				71	0.26	94	3			13			5	11	Case	42
				Total	73	0.26										
91	071523	27984	219266	0	0.00	93	2									
				49	0.18	94	3						3	4	Case	33
				Total	49	0.18										
92	070337	27166	418222	4	0.01	94	2						4			
				59	0.22	95	3		1			7	4	18 con 3 Case	25	
				Total	63	0.23										
92	070338	27452	233105	4	0.01	94	2						4			
				79	0.29	95	3						5	Case	45	
				83	0.30											
92	070339	27010	232770	3	0.01	94	2						3			
				53	0.20	95	3		6				2	Case	36	
				56	0.21											
93	070557	28421	250270	1	0.00	95	2									
				11	0.04	96	3								11	
				12	0.05											
93	070558	26381	251135	1	0.00	95	2						1			
				19	0.07	96	3								19	
				20	0.08											
93	070552	26498	497449	1	0.00	95	2						1			
				8	0.03	96	3								8	
				9	0.03											
94	071150	26860	485769	0	0.00	96	2									
94	071148	26319	500005	0	0.00	96	2									
94	071145	25878	511609	0	0.00	96	2									
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/a Survival data for the 1994 brood includes age-2 fish only (1996 returns).  
 /b Includes one fish recovered on spawn ground survey in Big White Salmon River.  
 /c Includes one fish recovered on spawn ground survey in Rogue River.  
 /d Unknown test fishery.

## Appendix O. (cont.)

CWT Code	Year Recov.	Washington							California Ocean		Canada Ocean				FWS Hatch.
		Owen		Net & Seine	Treaty Troll	Buoy 10	FW		Comm.	spt.	Comm.	S p t .	Net & Seine		
		Comm.	Spt.				Hatch.	Spt.							
075533	91 92		12												
075620	92 93		11		5	11			11		3				
075621	92 93		38		6	17			18						
075622	92 93		18		5	17			18		4				
071521	93 94					2									
071522	93 04														
071523	93 94		2								4				
070337	94 95		6			11					5				
070338	94 95		16												
070339	94 95		5												
070557	95 96														
070558	05 96														
070559	95 96														
071150	96														
071146	96														
071145	96														

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Appendix E. Liberation Information for summer steelhead coded-wire tagged and released in the Umatilla River Basin.

Brood	Number Released /a	Release Date	No./lb.	Number tagged	CWT code	Release location
87	10,187	April 88	7.4	9,829	073859	Minthorn
87	10,075	April 88	7.4	9,721	073860	Minthorn
87	<u>10,287</u>	April 88	7.4	<u>9,925</u>	073861	Minthorn
	30,549			29,475		
87	10,423	April 88	6.5	9,889	073858	Nr. Minthorn
87	10,171	April 88	6.5	9,455	073857	Nr. Minthorn
87	<u>10,163</u>	April 88	6.5	<u>9,448</u>	073858	Nr. Minthorn
	30,757			28,592		
88	9,849	May 89	8.8	8,784	074720	Minthorn
88	9,954	May 89	6.6	8,789	074723	Minthorn
88	<u>9,949</u>	May 89	6.6	<u>8,784</u>	074724	Minthorn
	29,852			26,357		
88	9,873	May 89	5.6	8,800	0747 15	Nr. Minthorn
88	9,864	May 89	5.8	8,791	0747 17	Nr. Minthorn
88	<u>9,849</u>	May 89	5.8	<u>8,778</u>	0747 18	Nr. Minthorn
	29,586			26,369		
89	10,239	May 90	5.9	9,331	075212	Bonifer
89	10,022	May 90	5.9	9,133	0752 13	Bonifer
89	<u>9,964</u>	May 90	5.9	<u>9,080</u>	0752 14	Bonifer
	30,225			27,544		
89	9,830	May 90	5.5	9,511	075215	Nr. Bonifer
89	9,845	May 90	5.5	9,525	075216	Nr. Bonifer
89	<u>9,771</u>	May 90	5.5	<u>9,454</u>	0752 17	Nr. Bonifer
	29,446			28,490		
90	10,086	May 91	6.2	9,835	075340	Bonifer
90	10,070	May 91	6.2	9,819	07534 1	Bonifer
90	<u>10,065</u>	May 91	6.2	<u>9,814</u>	075342	Bonifer
	30,221			29,468		
90	9,754	May 91	8.7	9,432	075343	Nr. Bonifer
90	9,790	May 91	8.7	9,467	075344	Nr. Bonifer
90	<u>9,781</u>	May 91	8.7	<u>9,458</u>	075345	Nr. Bonifer
	29,325			28,357		
91	22,474	March 92	5.8	10,394	073759	Bonifer/Minthorn
91	22,902	March 92	5.8	10,594	073882	Bonifer/Minthorn
91	<u>22,059</u>	March 92	5.8	<u>10,203</u>	074127	Bonifer/Minthorn
	67,435			31,191		

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Appendix E. (Cont.)

Brood	Number Released	Release Date	No./lb.	Number tagged	CWT code	Release location
91	22,262	April 92	5.0	10,108	075841	Mouth of Meacham Cr.
91	21,365	April 92	5.0	9,496	075842	Mouth of Meacham Cr.
91	<u>20,923</u>	April 92	5.0	<u>9,747</u>	075843	Mouth of Meacham Cr.
	64,550			29,353		
91	22,469	April/May 92	5.5	10,562	075838	Mouth of Meacham Cr.
91	22,662	April/May 92	5.5	10,275	075839	Mouth of Meacham Cr.
91	<u>22,288</u>	April/May 92	5.5	<u>10,105</u>	075840	Mouth of Meacham Cr.
	67,419			30,942		
92	15,115	April 93	4.5	10,194	076058	Bonifer
92	14,922	April 93	4.5	9,792	076059	Bonifer
92	<u>14,787</u>	April 93	4.5	<u>9,440</u>	076060	Bonifer
	44,824			29,426		
92	16,016	April 93	5.6	10,031	076055	Minthorn
92	15,940	April 93	5.6	9,418	078056	Minthorn
92	<u>16,023</u>	April 93	5.6	<u>9,643</u>	076057	Minthorn
	47,979			29,092		
92	23,862	May 93	6.1	13,117	076052	Bonifer
92	21,644	May 93	6.1	11,410	076053	Bonifer
92	<u>19,959</u>	May 93	6.1	<u>9,907</u>	076054	Bonifer
	65,465			34,434		
93	26,347	May 94	5.2	8,595	070139	Bonifer
93	<u>25,750</u>	May 94	5.2	<u>8,400</u>	070140	Bonifer
	52,097			16,995		
93	24,783	April 94	5.1	9,952	070141	Minthorn
93	<u>24,815</u>	April 94	5.1	<u>9,965</u>	070142	Minthorn
	49,598			19,917		
93	26,749	April 94	4.9	10,471	070143	Bonifer
93	<u>24,654</u>	April 94	4.9	<u>9,651</u>	070144	Bonifer
	51,403			20,122		
94	48,539	April 95	5.6	19,290	070657	Bonifer
94	49,983	April 95	4.7	18,812	070656	Minthorn
94	47,941	May 95	5.5	19,762	070655	Bonifer

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Appendix E. (Cont.)

Brood	Number Released	Release Date	No./lb.	Number tagged	CWT code	Release location
95	47,543	April 96	5.1	19,742	071035	Minthorn
95	49,377	April 96	5.3	21,205	071036	Bonifer
95	49,763	May 96	5.1	20,633	071034	Thornhollow
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/a The following releases are not included in the table:

33,984 adipose clipped fish at 10.3/lb. were released at Umatilla RM 23 In May, 1988  
 10,033 adipose clipped fish at 5.5/lb. were released at Umatilla RM 89 in December, 1988  
 22,274 adipose clipped fish at 5.5/lb. were acclimated and released horn Bonifer In April and May, 1999  
 29,522 adipose clipped fish at 7.7/lb. were acclimated and released with the coded-wire tagged fish at Bonifer in May, 1990  
 12,389 adipose clipped fish at 7.5/lb. were acclimated and released with the coded-wire tagged fish at Bonifer in May, 1991  
 3,998 adipose clipped fish at 12.5/lb. were released at Umatilla RM 3 in April 1991  
 6,443 adipose clipped fish at 5.8/lb. were released at Umatilla RM 3 In April, 1992  
 1,732 adipose clipped fish at 5.7/lb. were released at Umatilla RM 27.3 In April, 1994

Appendix F. Liberation information for fall chinook salmon coded-wire tagged and released in the Umatilla River Basin.

Brood	Number Released /a	Release Date	No./lb.	Number tagged	CWT code	Release location
81	306,279	April 82	79.0	46,707	050851	Uma RM 15 & 51.5
81	672,057	April 82	79.0	102,331	051057	Uma RM 1.5 & 51.5
	976,336			149,036		
81	2,828,835	April 82	92.0	102,386	072663	Uma RM 1.5
81	100,564	March 83	5.9	99,570	072741	Bonifer & Mea CR.
82	228,412	March 84	8.6	96,448	072829	Bonifer & Mea CR.
83	966,250	June 84	85.1	210,441	073124	Uma RM 1.5
	198,162	March 85	7.8	88,306	073127	Uma RM 87 & Bonifer
84	3223,172	June 85	92.3	206,756	073326	Uma RM 1.5
84	51,000	Oct 85	16.2	30,838	073182	Bonifer
84	91,036	March 86	5.0	99,396	073327	Minthorn
85	197,432	June 86	86.0	20,636	073833	Uma RM 1.5
85	198,153	June 86	86.0	21,335	073834	Uma RM 1.5
85	197,488	June 86	86.0	20,890	073835	Uma RM 1.5
85	196,952	June 86	86.0	20,170	073836	Uma RM 1.5
85	197,788	June 86	86.0	20,982	073837	Uma RM 1.5
85	208,103	June 86	88.0	20,815	073838	Uma RM 1.5
85	208,958	June 86	88.0	21,659	073839	Uma RM 1.5
85	207,550	June 96	86.0	20,269	073840	Uma RM 1.5
	208,184	June 88	86.0	20,895	073841	Uma RM 1.5
	298,994	June 86	86.0	21,694	073842	Uma RM 1.5
	2,029,602			209,145		
85	22,216	March 87	8.1	10,103	073823	Minthorn
85	22,523	March 87	8.1	10,243	073824	Minthorn
85	21,807	March 87	8.1	9,917	073825	Minthorn
85	20,881	March 87	8.1	9,498	073826	Minthorn
85	21,716	March 87	8.1	9,876	073827	Minthorn
	109,143			49,635		
85	20,786	March 87	8.6	10,253	073929	Bonifer
85	20,212	March 87	8.6	9,970	073829	Bonifer
85	20,546	March 87	8.6	10,135	073830	Bonifer
85	20,381	March 87	8.8	10,053	073831	Bonifer
85	20,438	March 87	8.6	10,081	073832	Bonifer
	102,363			50,492		
88	497,572	May 87	60.4	40,793	073912	Uma RM 9
88	501,266	May 87	60.4	41,096	073913	Uma RM 9
86	477,992	May 87	80.4	39,187	073914	Uma RM 9
	1,476,830			121,076		

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## Appendix F. (cont.)

Brood	Number Released	Release Date	No./lb.	Number tagged	CWT code	Release location
<del>86</del>	670	July 87	20.0	643	073915	Minthorn
<del>86</del>	672	July 67	20.0	645	073916	Minthorn
<del>86</del>	<u>658</u>	July 87	20.0	<u>632</u>	074035	Minthorn
	2,000			1,920		
86	52,317	March 88	8.8	42,068	074038	Minthorn
<del>86</del>	<u>48,474</u>	March 66	8.8	<u>38,978</u>	074039	Minthorn
	100,791			81,046		
86	50,480	March 88	10.2	39,509	074036	Bonifer
88	<u>49,070</u>	March 88	10.2	<u>38,405</u>	074037	Bonifer
	99,550			77,914		
87	1,886,757	May 88	68.3	196,285	075007	Uma RM 23
87	4,823	Nov 88	9.8	4,438	074539	Minthorn
87	4,660	Nov 88	9.8	4,289	074540	Minthorn
87	<u>4,925</u>	Nov 88	9.8	<u>4,533</u>	074541	Minthorn
	14,408			13,260		
87	26,858	NW 88	8.6	24,656	074536	Nr Minthorn
87	25,493	NW 88	8.6	23,403	074537	Nr Minthorn
87	<u>27,330</u>	Nov 88	8.6	<u>25,089</u>	074539	Nr Minthorn
	79,681			73,148		
88	797,904	May 89	68.6	52,228	074648	Uma RM 23
88	797,903	May 89	66.6	49,771	074647	Uma RM 23
88	<u>797,903</u>	May 89	66.6	<u>52,244</u>	074648	Uma RM 23
	2,393,710			154,243		
88	26,770	Oct 89	10.9	26,358	074753	Minthorn
88	26,617	Oct 89	10.9	25,028	074754	Minthorn
88	<u>25,438</u>	Oct 89	10.9	<u>25,438</u>	074757	Minthorn
	78,825			76,824		
88	27,071	Oct 89	11.1	26,790	074758	Nr Minthorn
88	25,428	Oct 89	11.1	24,285	074760	Nr Minthorn
88	<u>25,633</u>	Oct 89	11.1	<u>25,350</u>	074763	Nr Minthorn
	78,132			76,425		
89	808,567	May- Jun 90	87.5	52,612	075403	Uma RM 70 -79
89	<del>808,560</del>	May- Jun 90	87.5	53,160	075404	Uma RM 70-79
89	<u>808,554</u>	May-Jun 90	87.5	<u>53,248</u>	075405	Uma RM 70 -79
	2,425,681			159,020		
89	25,311	Oct 90	9.2	23,396	075325	Minthorn
89	23,724	Oct 90	9.2	21,929	<del>075326</del>	Minthorn
89	<u>22,828</u>	Oct 90	9.2	<u>21,101</u>	075327	Minthorn
	71,863			66,426		

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## Appendix F. (cont.)

Brood	Number Released	Release Date	No./lb.	Number tagged	CWT code	Release location
a9	25,472	Oct 90	8.8	23,413	075322	Nr Minthorn
a9	25,694	Oct 90	8.8	23,617	<del>075323</del>	Nr Minthorn
a9	<u>25,460</u>	Oct 90	8.8	<u>23,420</u>	075324	Nr Minthorn
	76,646			70,450		
90	<b>1,343,311</b>	May 91	82.0	52,252	075225	Uma RM 70 & 79
90	<b>1,343,042</b>	May 91	<del>82.0</del>	51,728	075226	Uma RM 70 & 79
90	<b>100,642</b>	May 91	73.0	46,266	075326	Uma RM 70 & 79
90	99,962	May 91	<b>73.0</b>	<b>48,481</b>	075449	Uma RM 70 & 79
90	99,225	May 91	73.0	48,301	070016	Uma RM 70 & 79
90	52,326	May 91	<del>82.0</del>	51,614	075450	Uma RM 70
90	<u>52,706</u>	May 91	82.0	<u>52,444</u>	075451	Uma RM 70
	<b>3,091,214</b>			353,286		
90	26,461	May 91	80.5	26,173	075563	Minthorn
90	26,565	May 91	60.5	24,762	075601	Minthorn
90	<u>26,606</u>	May 91	80.5	<u>25,476</u>	075602	Minthorn
	79,672			76,411		
90	25,662	May 91	<del>86.0</del>	25,720	<del>075560</del>	Nr Minthorn
90	25,708	May 91	<del>86.0</del>	25,425	075561	Nr Minthorn
90	<u>23,295</u>	May 91	<del>86.0</del>	<u>22,339</u>	<del>075562</del>	Nr Minthorn
	74,665			73,454		
90	122,639	March 92	7.7	28,160	075619	Uma RM 56
90	<u>97,801</u>	March 92	7.6	<u>26,178</u>	075618	Uma RM 70
	220,440			52,338		
91	266,578	May 92	70.6	31,892	071429	Uma RM 42.5
91	261,350	May 92	65.1	<b>32,287</b>	071430	Uma RM 42.5
91	182,931	May 92	56.2	28,951	071431	Uma RM 42.5
91	<b>191,257</b>	May 92	56.3	29,425	071432	Uma RM 42.5
91	303,878	May 92	61.0	29,066	071433	Uma RM 42.5
91	<b>306,802</b>	May 92	<b>65.7</b>	31,224	071434	Uma RM 42.5
91	<b>297,331</b>	May 92	60.9	30,326	<b>071435</b>	Uma RM 42.5
91	<b>302,555</b>	May 92	<b>61.9</b>	<b>30,365</b>	071436	Uma RM 42.5
91	<b>223,830</b>	May 92	55.2	<b>30,508</b>	071437	Uma RM 42.5
91	<u>301,831</u>	May 92	64.5	<u>30,924</u>	<b>071438</b>	Uma RM 42.5
	<b>2,678,343</b>			<b>304,968</b>		
91	66,345	March 93	9.0	23,239	071461	Uma RM 73.5
91	<u>63,492</u>	March 93	9.2	<u>23,863</u>	071460	Uma RM 73.5
	134,837			47,102		
92	<b>292,895</b>	May 93	63.0	28,964	<b>076330</b>	Uma RM 73.5
92	269,336	May 93	62.9	27,092	070127	Uma RM 73.5
92	<b>282,175</b>	May 93	68.0	<b>29,958</b>	076334	Uma RM 73.5
92	282,125	May 93	67.3	29,537	076331	Uma RM 73.5
92	273,662	May 93	60.3	<b>29,71 a</b>	<b>076333</b>	Uma RM 73.5

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Appendix F. (cont.)

Brood	Number Released	Release Date	No./lb.	Number tagged	CWT code	Release location
92	277,931	May 93	61.5	29,451	076332	Uma RM 73.5
92	268,001	May 93	59.3	29,594	070128	Uma RM 73.5
92	203,731	May 93	66.7	30,708	076329	Uma RM 73.5
92	272,498	May 93	60.3	29,360	070125	Uma RM 73.5
92	<u>207,565</u>	May 93	59.4	<u>30,462</u>	076x6	Uma RM 73.5
	2,629,917			294,642		
92	233,629	March 94	10.4	23,699	070255	Uma RM 73.5
92	49,824	April 94	8.5	23,470	070252	Uma RM 73.5
93	322,867	May 94	63.0	31,162	070663	Uma RM 73.5
93	327,700	May 94	72.4	31,858	070719	Uma RM 73.5
93	314,518	May 94	65.4	30,528	070720	Uma RM 73.6
93	326,406	May 94	66.2	30,447	070723	Uma RM 73.5
93	303,843	May 94	69.0	30,950	070722	Uma RM 73.5
93	306,105	May 94	68.7	28,474	070721	Uma RM 73.5
93	280,046	May 94	60.1	31,239	070662	Uma RM 73.5
93	279,965	May 94	64.2	31,040	070716	Uma RM 73.5
93	191,321	May 94	59.1	30,502	070716	Uma RM 73.5
93	<u>190,438</u>	May 94	60.0	<u>32,481</u>	070717	Uma RM 73.5
	2,843,212			308,481		
93	111,617	April 95	7.8	24,865	070656	Thornhollow
93	<u>115,271</u>	April 95	8.2	<u>24,374</u>	070659	Thornholbw
	227,068			49,239		
94	287,313	May 95	63.0	28,623	071023	Thornholbw
94	<u>274,110</u>	May 95	66.5	<u>29,784</u>	071025	Thanhollow
	561,423			58,407		
94	271,129	May 95	67.8	29,736	071017	Imeques
94	241,342	May 95	65.1	29,132	071018	Imeques
94	286,459	May 95	62.7	29,353	071019	Imeques
94	275,613	May 95	65.6	29,460	071020	Imeques
94	152,098	May 95	56.7	29,327	071021	Imeques
94	280,406	May 95	63.0	28,472	071022	Imeques
94	151,943	May 95	62.3	30,204	071024	Imeques
94	<u>245,885</u>	May 95	58.0	<u>30,106</u>	071026	Imeques
	1,904,875			235,790		
94	217,294	April 96	7.0	28,521	071036	Imeques
94	48,499	April 96	5.3	23,238	071039	Imeques
94	47,463	April 96	4.7	23,442	071040	Imeques
94	<u>47,125</u>	April 96	5.3	<u>23,343</u>	071041	Imeques
	143,087			70,023		
94	204,022	April 96	7.1	27,397	071 a37	Thanhollow

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Appendix F. (cont.)

Brood	Number Released	Release Date	No./lb.	Number tagged	CWT code	Release location
95	393,339	May 96	72.8	29,652	071157	Thornhollow
95	460,259	May 96	69.5	26,476	071327	Thanhollow
	653,596			56,326		
95	266,913	May 96	67.2	29,646	071322	Imeques
95	272,594	May 96	66.4	30,243	071324	Imeques
95	161,291	May 96	56.5	30,236	071326	Imeques
95	161,709	May 96	60.3	30,455	071326	Imeques
95	303,603	May 96	m.5	30,015	071320	Imeques
95	299,233	May 96	66.4	26,997	071321	Imeques
95	300,377	May 96	62.8	29,914	071323	Imeques
95	300,695	May 96	67.4	30,220	071325	Imeques
	2,106,815			239,726		

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/a The following releases are not Included In the table:

115,779 non-tagged fish at 4.7/lb. were acclimated and released from Bonifer In March, 1986  
 35,574 non-tagged fish at 11.6/lb. were acclimated and released from Minthorn In October, 1986  
 1,429,250 non-tagged fish at 93.1/lb. were released at Umatilla RM 9 In June, 1966  
 217,443 non-tagged fish at 8.6/lb. were released at Umatilla RM 63 & 73.5 In March, 1989  
 255,614 non-tagged fish at 8.2/lb. were released at Umatilla RM 70 in March, 1990  
 629,800 non-tagged fish at 82.4/lb. were released at Umatilla RM 70 & 79 In May, 1990  
 194,647 non-tagged fish at 7.8/lb. were released at Umatilla RM 56, 70 and 79 in March, 1991  
 10,462 non-tagged fish at 60-l 94/lb. were released at Umatilla RM 3 In April and May, 1991  
 504,369 non-tagged fish at 53.4/lb. were released at Umatilla RM 42.5 in May, 1992  
 7,837 non-tagged fish at 62.8-l 12/lb. were released at Umatilla RM 3 In April and May, 1992  
 29,661 non-tagged fish at 95.5-l 42/lb. were released between Umatilla RM 0.5 and 27.3 in March through May, 1993  
 22,174 non-tagged fish at 85 to 171/lb. were released between Umatilla RM 27.3 and 32.5 In April and May, 1994

Appendix G. Liberation information for spring chinook salmon coded- wire tagged end released in the Umatilla River Basin.

Brood	Number Released /a	Release Date	No/lb.	Number Tagged	CWT Cods	Release Location
86	35,948	Mar-Apr 88	10.1	26,840	074325	Bonifer
86	35,146	Mar-Apr 88	10.1	25863	074326	Bonifer
86	35,137	Mar-Apr 66	10.1	25853	074327	Bonifer
	106,231			76,356		
86	34,167	April 88	6.6	26,319	074326	Uma RM 23 & Nr. Bonifer
86	33,573	April 88	6.6	25,722	074329	Uma RM 23 & Nr. Bonifer
86	34,116	April 88	6.6	26252	074330	Uma RM 23 & Nr. Bonifer
	101,676			76,293		
87	416	Nov 66	21 A	410	074420	Bonifer
a7	399	Nw 66	21 A	393	074423	Bonifer
a7	381	Nw 66	21 A	376	074424	Bonifer
	1,196			1,179		
a7	26,109	Nov 66	11.1	25867	074427	Uma RM 89
a7	24,163	Nov 66	11.1	24,070	074429	Uma RM 89
a7	25,475	Nov 66	11.1	25,356	074430	Uma RM 69
	75,767			75,413		
87	26,135	Mar-May as	10.8	25,427	074433	Bonifer
a7	27,756	Mar-May as	10.8	27,004	074434	Bonifer
87	26,093	Mar-May as	10.8	25,366	074436	Bonifer
	79,984			77817		
87	26,153	March 89	10.8	27,585	07443s	Nr. Bonifer
67	26,116	March 89	10.6	27,550	074440	Nr. Bonifer
87	24,883	March 89	10.8	24,165	074443	Nr. Bonifer
	80,932			79,300		
88	24,968	Oct as	12.1	24801	075063	Bonifer
88	26299	Oct as	12.0	28,109	075101	Bonifer
88	27,463	Oct 69	12.0	27,299	075102	Bonifer
	60,750			60209		
88	27267	Oct 69	12.0	27,137	075103	Nr. Bonifer
88	26,716	Oct 89	12.0	26560	075104	Nr. Bonifer
88	27,848	Oct as	12.0	27895	075105	Nr. Bonifer
	83,853			63,392		
88	36,224	March 90	9.0	26,638	075106	Bonifer
88	37,538	March 90	9.0	26,160	075107	Bonifer
88	38,583	March 90	9.0	26,888	075106	Bonifer
	114,345			79,886		
88	39,012	March 90	9.6	25,611	075100	Nr. Bonifer
88	40,072	March 90	9.6	26,307	075110	Nr. Bonifer
88	36,343	March 90	9.6	25,172	075111	Nr. Bonifer
	117,427			77,090		
60	26,757	Oct 90	11.5	26,670	074505	Bonifer
89	26,805	Oct 90	11.5	26,717	074506	Bonifer
89	26,876	Oct 90	11.5	26,788	074507	Bonifer
	60,439			80,175		
89	26,050	Oct so	13.4	25,878	074506	Nr. Bonifer
89	26,279	Oct so	13.4	26,104	074509	Nr. Bonifer
as	25,689	Oct so	13.4	25,497	074510	Nr. Bonifer
	77,998			77,477		

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## Appendix G. (cont.)

Brood	Number Released	Release Date	No./lb.	Number Tagged	CWT code	Release Location
89	33,473	March 91	10.1	25,947	075114	Bonifer
89	33,440	March 91	10.1	25,921	0751 15	Bonifer
89	33,583	March 91	10.1	26,039	075116	Bonifer
	100,505			77807		
89	31,932	March 91	11.8	24,365	075440	Nr. Bonifer
89	32,167	March 91	11.8	24,559	075441	Nr. Bonifer
89	32,032	March 91	11.8	24,441	075442	Nr. Bonifer
	96,152			73,368		
89	90,798	April 91	20.8	22,336	635681	Uma RM 89
89	5,837	Apr-May 91	16.9	1,461	635681	Uma RM 3
	96,733			23,707		
90	27,040	Nov 91	165	26,769	075826	Bonifer
90	27,007	Nw 91	165	26,737	075627	Bonifer
90	27,098	Nov 01	165	26,827	073628	Bonifer
	81,144			80,333		
90	26,019	Nov 91	16.8	25,499	075629	Nr. Bonifer
90	25,900	Nw 91	16.8	25,382	075630	Nr. Bonifer
90	26,561	Nov 91	16.8	26,029	075631	Nr. Bonifer
	78,480			76,910		
90	90,982	April 92	16.7	30,108	633982	Uma RM 89
90	6,272	Apr-May 92	16.7	1,745	633982	Uma AM 3
	96,254			31,851		
90	36,351	April 92	9.2	26,570	075635	Bonifer
90	36,154	April 92	9.2	26,426	076636	Bonifer
90	36,598	April 92	9.2	26,750	075637	Bonifer
	109,101			79,748		
90	32,894	April 92	8.5	25,503	075832	Mouth of Meacham Cr.
90	32,953	April 92	a.5	25,472	075633	Mouth of Meacham Cr.
90	32,982	April 92	6.5	25,472	075634	Mouth of Meacham Cr.
	98,928			76,468		
91	97,013	May 92	32.1	50,811	071443	Uma RM 80
91	63,665	May 92	31.2	48,051	071444	Uma RM 60
91	63,305	Msy 92	32.2	49,496	071445	Uma RM 60
91	95,458	May 92	32.1	50,045	071446	Uma RM 80
91	104,870	May 92	36.4	50,047	071447	Uma RM 80
91	104,929	May 92	38.3	51,707	071448	Uma RM 80
91	109,528	May 92	36.3	51,516	071449	Uma RM 80
91	109,997	May 92	37.8	51,271	071460	Uma RM 80
91	98,817	May 92	39.2	52,126	071451	Uma RM 80
91	108,852	Msy 92	36.8	51,859	071452	Uma RM 60
	955,752			506,535		
91	25,104	Nov 92	13.0	25,104	076042	Uma RM 60
91	25,075	Nov 92	13.0	24,992	076043	Uma RM 60
91	15,730	Nov 92	13.1	15,423	076044	Uma RM 80
91	24,838	Nov 92	9.9	24,838	076045	Uma RM 80
91	24,715	Nov 92	10.0	24,221	076046	Uma RM 80
91	17,667	Nw 92	10.1	17,269	076047	Uma RM 60
	132,929			131,847		
91	50,736	Nw 92	19.3	26,135	071542	Uma RM 80
01	50,880	Nov 92	19.5	25,833	071543	Uma RM 80
	101,416			51,766		

Revised: 7/1 1/98

File Name: C:\123R3\DATA\98CHSREL

## Appendix G. (cont.)

Brood	Number Released	Release Date	No./lb.	Number Tagged	CWT Code	Release Location
91	92,728	March 93	14.7	19,951	071455	Uma RM 60
91	94,220	March 93	143	20,022	071456	Uma RM 60
	186,948			39,973		
91	50,310	March 93	9.2	21,499	075739	Uma RM 80
91	50,109	March 93	6.1	20,880	075740	Uma RM 80
91	54,347	March 93	8.3	21,157	075741	Uma RM 80
91	54,016	March 93	6.6	20,307	075742	Uma RM 80
	208,792			63,843		
91	85,134	April 93	20.3	27,839	635950	Uma RM 69
91	1,628	April 93	20.0	532	635950	Uma RM 3
91	9,326	April 93	205	3,050	635950	Uma RM 27.3
	96,086			31,421		
92	105,290	June 93	27.0	52,588	076136	Uma RM 60
92	108,473	June 93	27.3	51,680	076 135	Uma RM 60
02	113,852	June 93	295	52,893	076132	Uma RM 80
92	111,103	June 93	27.1	52,172	076137	Uma RM 60
02	111,133	June 93	27.4	51,963	076134	Uma RM 60
92	116,316	June 93	26.1	52,335	076133	Uma RM 80
	667,367			313,831		
92	49,894	Nov 93	203	34,541	070159	Uma RM 60
92	52,211	N w 93	215	35,657	070161	Uma RM 60
92	47,867	Nw 93	20.8	38,102	0702 16	Uma RM 80
92	49,081	N w 93	20.9	35,406	070160	Uma RM 80
92	48,343	Nw 93	202	35,467	070162	Uma RM 60
92	49,318	Nw 93	20.8	36,157	070163	Uma RM 80
92	40,661	N w 93	165	35,710	070155	Uma RM 60
02	39,858	N w 93	18.0	34,857	070157	Uma RM 60
92	42,734	Nov 93	18.8	33,989	070158	Uma RM 80
92	41,244	N w 93	192	33,130	070158	Uma RM 80
	480,809			352,028		
92	51,938	March 94	8.4	20,962	070220	Uma RM 80
92	52,820	March 94	8.6	20,971	0702 1 9	Uma RM 80
92	51,210	March 94	6.5	20,070	0702 17	Uma RM 80
92	49,375	March 94	6.1	19,920	0702 18	Uma RM 60
	205,143			81,943		
92	75,835	March 94	115	26,305	070251	Uma RM 735
92	77,019	March 94	115	26,305	070250	Uma RM 735
	152,854			53,021		
92	128,468	March 94	12.3	20,219	075945	Uma RM 60
92	125,780	March 94	123	20,109	075944	Uma RM 60
	252,246			40,326		
93	140,591	May 94	30.7	49,726	070734	Uma RM 80 /b
93	141,901	May 94	30.7	52,296	070735	Uma RM 80 /b
83	139,717	May 94	30.1	52,638	070736	Uma RM 80 /b
93	142,513	May 94	30.1	53,172	070737	Uma RM 80 /b
93	139,687	May 94	305	51,042	070736	Uma RM 80 /b
93	134,968	May 94	305	52,317	070739	Uma RM 80 /b
	839,377			311,191		

Revised: 7/11/96

File Name: C:\123R3\DATA\98CHSREL

Appendix G. (cont.)

Brood	Number Released	Release Date	No/lb.	Number Tagged	CWT Code	Release Location
93	36234	N w 94	Q.5	34,808	070728	Uma RM 80 /b
93	38551	N w 94	105	35,156	070728	Uma RM 80 /b
93	39,548	N w 94	9.0	34,124	070724	Uma RM 80 /b
93	40,383	N w 94	8.4	35,160	070729	Uma RM 80 /b
93	39,487	N w 94	8.2	34,819	070727	Uma RM 80 /b
93	39,517	N w 94	9.3	34,827	070725	Uma RM 80 /b
93	37,086	N w 94	7.0	35,750	070731	Uma RM 80 /b
93	34,849	N w 94	0.6	34,220	070733	Uma RM 80 /b
93	37,073	N w 94	7.2	34,915	070730	Uma RM 80 /b
93	32,687	N w 94	7.4	32,251	070732	Uma RM 80 /b
	376,225			346,030		
93	49,001	March 95	8.3	18,884	070651	Uma RM 80 /b
93	44,077	March 95	7.4	19,052	070652	Uma RM 80 /b
93	47,846	March 95	7.9	19,091	070654	Uma RM 80 /b
93	44,188	March 95	6.2	16,175	070653	Uma RM 80 /b
93	50,007	March 95	7.5	20,315	071453	Uma RM 80 /b
93	40,885	March 95	8.1	15,661	071454	Uma RM 80 /b
	275,804			111,156		
93	123,257	April 95	105	22,169	070648	Uma RM 80 /b
93	124,614	April 95	102	24,088	070650	Uma RM 80 /b
	247,871			46,277		
93	74,735	March 95	14.4	23,807	070660	Uma RM 80 /b
93	74,821	April 95	11.4	26,765	070661	Uma RM 80 /b
94	49,032	March 96	9.0	19,822	071027	Uma RM 80 /b
94	45,887	March 96	10.8	18,844	071028	Uma RM 80 /b
Q4	40,121	March 96	9.0	19,258	071029	Uma RM 80 /b
94	80,599	March 96	7.5	19,981	071030	Uma RM 80 /b
94	58,709	March 96	Q.5	19,583	071033	Uma RM 80 /b
94	60,137	March 96	8.8	20,068	071031	Uma RM 80 /b
94	57,076	March 96	6.7	19,874	071032	Uma RM 80 /b
	376,581			137,208		

Revised: 7/11/96

File Name: C:\123R3\DATA\96CHSREL

/a The following releases are not included in the table:

99,895 non-tagged fish at 20.8/lb. were released at Umatilla RM 23 in April, 1988

89,268 non-tagged fish at 10.3/lb. were released into the upper Umatilla River in April, 1988

99,775 non-tagged fish at 18.8/lb. were released at Umatilla RM 23 in April, 1990

294,458 non-tagged fish at 32.5/lb. were released at Umatilla RM 60 in May, 1992

6,690 non-tagged fish at 8.1 to 8.3/lb. were released at Umatilla RM 3 and 292 in March and April, 1994

/b Acclimated at Imeques C-mem-ini-kem prior to release.

Appendix H. Liberation information for coho salmon coded-tire tagged and released in the Umatilla River Basin.

Brood	Number Released	la	Release Date	No./lb.	Number tagged	CWT code	Release location
85	37,245		April 87	13.5	13,440	073617	Minthorn
85	53,754		April 87	13.5	19,879	073624	Minthorn
85	<u>70,890</u>		April 87	13.5	<u>26,740</u>	073625	Minthorn
	161,889				60,059		
88	334,038		Mar-Apr 88	16.8	20,592	074356	Uma RM 9 & 23
88	360,689		Mar-Apr 88	17.3	18,963	074357	Uma RM 9 & 23
86	<u>301,706</u>		Mar-Apr 88	15.7	<u>18,513</u>	074358	Uma RM 9 & 23
	996,433				58,068		
67	75,970		March 89	17.2	27,062	074609	Nr Minthorn
87	72,627		March 89	17.3	26,416	074610	Minthorn
87	<u>84,672</u>		March 89	19.1	<u>26,739</u>	074611	Minthorn
	233,269				80,217		
88	87,309		March 90	13.5	28,033	074814	Minthorn
88	59,662		March 90	13.3	26,881	074813	Nr Minthorn
88	<u>65,095</u>		April 90	11.2	<u>27,226</u>	074815	Minthorn
	192,086				82,140		
89	152,974		March 91	15.4	24,584	075535	Minthorn
89	449,678		March 91	16.5	25,338	075534	Uma RM 56-60
69	<u>352,977</u>		March 91	16.8	<u>25,407</u>	075533	Uma RM 63-70
	955,629				75,329		
90	472,221		March 92	15.5	27,908	075620	Uma RM 56
90	244,615		March 92	15.7	27,705	075621	Uma RM 60
90	<u>244,550</u>		March 92	15.7	<u>27,458</u>	075622	Uma RM 60
	981,386				83,071		
91	454,794		April 93	17.6	28,273	071521	Uma RM 60
91	218,618		April 93	17.5	27,821	071522	Uma RM 42.5
91	<u>219,266</u>		April 93	17.5	<u>27,984</u>	071523	Uma RM 42.5
	892,678				84,078		
92	418,222		April 94	18.1	27,166	070337	Uma RM 42.5
92	233,105		April 94	17.0	27,452	070338	Uma RM 60
92	<u>232,778</u>		April 94	17.1	<u>27,010</u>	070339	Uma RM 60
	884,105				81,628		

Revised: 7/11 /96

File Name: C:\123R3\DATA\96COHREL

Appendix H. (cont.)

Brood	Number Released /a	Release Date	No./lb.	Number tagged	CWT code	Release location
93	250,970	Mar-Apr 95	14.7	26,421	070557	Uma RM 42.5
93	251,135	Mar-Apr 95	14.7	26,381	070558	Uma RM 42.5
93	<u>497,449</u>	March 95	14.5	<u>26,498</u>	070559	Uma RM 60
	999,554			79,300		
94	465,769	March 96	17.9	26,860	071150	Uma RM 42.5
94	500,005	April 96	18.0	26,319	071146	Uma RM 60
94	<u>511,609</u>	April 96	18.6	<u>25,878</u>	071145	Uma RM 42.5
	1,011,614			52,197		
Revised: 7/11/96				FileName: C:\123R3\DATA\96COHREL		

/a The following releases **are** not included in the table:

786,660 **non-tagged fish** at **14.0/lb.** were released at Umatilla RM 23 in **April, 1987**  
753,637 non-tagged **fish** at **17.6/lb.** were released at Umatilla RM 56 and 70 in March, 1989  
594,527 non-tagged **fish** at **14.8/lb.** were released at Umatilla RM 70 in March and **April, 1990**  
202,315 non-tagged **fish** at **14.5/lb.** were released at Umatilla RM 23 in March, **1990**  
191,854 non-tagged **fish** at **13.9/lb.** were released at Umatilla RM 60 in **April, 1995**  
322,858 non-tagged fish at **20.3/lb.** were released at Umatilla RM 42.5 in **February** and March, **1995**



**Appendix I. Fish sampled at the Westland Canal juvenile facility in 1996. /a**

		Salmonids							
		Marked		Unmarked					
Date	No. Fish Sampled	Fall Chinook (SY)	STS (Y)	coho (SY)	Coho (Y)	Chinook	Rainbow Trout	STS (Y)	Non-game & Warm Water Species
6/10	429	422	1		3	1	2		
6/12	408	406						1	1
6/14	383	380	1				1		1
6/17	432	426			1		1		4
6/19	329	325			1				3
6/21	329	325							3
6/24	361	360					1		
6/26	318	317							1
6/28	355	354							1
7/1	313	310		1			1		1
7/9	237	228							9
7/11	271	266							5
7/16	160	153							7
7/18	183	170							13
7/23	158	152							6
7/25	117	83							34
7/31	148	95							53
8/17	178	24							154
TOTAL	5109	4796	2	1	5	1	6	2	296

Revised: 8/28/96

File Name: C:/1 23R3/DATA/WLSAMP96

/a Fish were sampled on 18 out of the 37 days fish were hauled. Y = yearling; SY = subyearling.

Appendix J. Umatilla River summer steelhead broodstock collection in 1995–96. /a

Date Collected	Ad LV		Total Ad LV	Unmarked		Total Unmarked	Total		Total
	Male	Female		Male	Female		Male	Female	
28-Sep		1	1	1	1	2	1	2	3
02-Oct	1		1	1	1	2	2	1	3
09-Oct		1	1	2	2	4	2	3	5
12-Oct	1		1		1	1	1	1	2
13-Oct				1	1	2	1	1	2
16-Oct	1		1	1		1	2		2
19-Oct				2	1	3	2	1	3
20-Oct					1	1		1	1
23-Oct	2	1	3				2	1	3
14-Nov		1	1	1	2	3	1	3	4
15-Nov				3	1	4	3	1	4
16-Nov	2	1	3		1	1	2	2	4
17-Nov	3	2	5	4	4	8	7	6	13
20-Nov				2	2	4	2	2	4
27-Nov				1	1	2	1	1	2
06-Dec	2	4	6	4	4	8	6	8	14
08-Dec				2	2	4	2	2	4
12-Dec	1		1	1	1	2	2	1	3
18-Dec	4	3	7	6	6	12	10	9	19
22-Dec				3	3	6	3	3	6
04-Jan				3	3	6	3	3	6
16-Jan				3	3	6	3	3	6
08-Mar				2	2	4	2	2	4
18-Mar				2	4	6	2	4	6
21-Mar				2	2	4	2	2	4
08-Apr				3	3	6	3	3	6
Totals /a	17	14	31	50	52	102	67	66	-133
Totals /b	16	12	28	56	49	105	72	61	133

Revised: 5/13/96

File Name: C:\123R3\DATA\96BRCOL

/a The data in the table were taken at Three Mile Dam and were provided by CTUIR and ODFW Trap and Haul personnel.

/b These numbers were provided from data taken at Minthorn.

Appendix K. Summer steelhead broodstock spawning at Mirthorn Acclimation Facility in 1996.

Date Spawned	Fish No.	Sex	Family No.	Fork Ln. mm	MEHP mm	Ln Weight gms.	Fin Mark	Comments	Green Eggs	Eyed Eggs
04/02/96	1	F	1	590	460	1390	None			
	2	F	1	710	590	2160	None			
	3	F	1	560	560	2260	None			
	4	M	1	750	580	3430	AdLV			
	5	M	1	750	600	3270	AdLV			
	6	M	1	600	490	1590	AdLV			
	7	F	2	590	460	1400	AdLV			
	8	F	2	570	450	1140	AdLV			
	9	F	2	560	460	1200	AdLV			
	10	M	2	640	520	2200	None			
	11	M	2	620	500	1610	None			
	12	M	2	600	490	1870	None			
	13	F	3	610	510	1570	None			
	14	F	3	640	530	1770	None			
	15	F	3	690	570	2030	None			
	16	M	3	600	490	1610	None			
	17	M	3	610	490	1760	None			
	18	M	3	620	500	2020	None			
	19	M	- -	630	510	2100	None	Killed by mistake		
									49,014	31,020
04/10/96	20	F	4	595	490	1350	None			
	21	F	4	670	570	1970	None			
	22	M	4	650	555	2060	None			
	23	M	4	670	555	2170	None			
									11,510	5,686
04/17/96	24	F	5	755	650	2970	None			
	25	F	5	750	660	2750	None			
	26	M	5	620	520	1990	None			
	27	M	5	625	530	1620	None			
	28	F	6	740	630	2220	None			
	29	F	6	630	540	1730	None			
	30	M	6	615	530	1910	None			
	31	M	6	635	530	2240	None			
									25,664	21,306
04/26/96	32	F	7	620	549	1620	None			
	33	F	7	799	704	3160	None			
	34	F	7	645	555	1670	None			
	35	M	7	653	545	2060	AdLV			
	36	M	7	635	533	1950	AdLV			
	37	M	7	613	510	1990	AdLV			
	38	F	8	595	520	1450	None			
	39	F	8	751	613	2360	AdLV			
	40	F	8	600	525	1620	None			
	41	M	6	600	510	1620	None			
	42	M	6	617	517	1660	None			
	43	M	6	- - -	550	2250	None			
									35,088	33,339
05/01/96	44	F	9	695	605	1970	None			
	45	F	9	730	605	2190	None			
	Live Spawned with three AdLV males									
	46	F	10	580	490	1290	None			
	47	F	10	570	465	1300	None			
Live spawned with three unmarked males /a									22,416	21,950

Revised: 12/31/96

File Name: C:\123R3\DATA\SPAWN96

Appendix K. (Cont)

Date Spawned	Fish No.	Sex	Family No.	Fork fn mm	MEHP mm	Ln Weight gms.		Green Eggs	Eyed Eggs
05/08/96	46	F	11	660	575	1850	None		
	49	M	11	705	600	2010	None		
	50	F	12		510	2280	AdLV		
	61	M	12	620		1670	None		
	62	M	12	630	515	1650	None		
								11,373	10,238
05/15/96	53	F	13	580	480	1150	None		
	54	F	13	590	480	1300	None		
	55	F	13	630	530	1596	None		
		Live spawned with three unmarked males							
	56		14	630	520	1560	None		
	57	F				1630	None		
	58	F	14	640 620	540 520	1460	None		
	59					1740	AdLV		
	60	M	14 14	615 620	515 510	1680	AdLV		
	61	M	14	600	490	1410	AdLV		
								25,441	22,320
05/22/96	62	F	15	595	502	1300	AdLV		
	63	F	15	720	620	2170	Ad only		
		Live spawned with three unmarked males							
								11,536	10,690
05/29/96	64	F	16	625	525	1550	None		
	65	F	16	662	585	2220	None		
	66	M	16	574	493	1310	None		
	67	M	16	622	520	1710	Ad only		
	68		16	625	530	1960	None		
	69	M	16	546	450	1290	None		
	70	F	17	562	490	1190	None		
	71	F	17	580	494	1300	AdLV		
	72	M	17	600	505	1690	None		
	73	M	17	618	520	1830	None		
								23,364	20,626
								-	-
							Total	215,408	177,175
							Fecundity	5,385	

Revised: 12/31/96

File Name: C:\123R3\DATA\SPAWN96

/a One male was not sampled for replicating viruses due to insufficient milt.

Appendix L. Fall chinook salmon broodstock spawning and mortality at Three Mile Dam in 1996. la

Date	No. of Fish Spawned		No. of Green Eggs Taken	No. of Eyed Eggs Taken	No. of Mortality from Natural Causes		No. of Jumpouts		No. of Mortality from Mechanical Injury	
	Females	Males			Females	Males	Females	Males	Females	Males
27-Sep								1		
28-Sep								1		
30-Sep								4		
01-Oct								1		
07-Oct							2			
13-Oct								1		
16-Oct					3	2				
22-Oct								1		
31-Oct					7				1	
01-Nov	22	16	95,087	52,498					1	
02-Nov					2	1				
04-Nov					1	3			1	3
05-Nov	22	22	92,881	52,500	2					
07-Nov					1	1			2	4
08-Nov	20	20	60,482	65,462		2			1	
10-Nov					2	1				
11-Nov	64	62	257,554	191,311	1	4				
12-Nov									1	
13-Nov					4					2
15-Nov	31	31	109,723	52,500	9	5			1	1
17-Nov					1	4				
19-Nov	24	24	80,052	49,176		1			2	
22-Nov	16	16	51,333	33,700	3					
26-Nov	3	2	11,146	7,000		1				
TOTAL	202	195	778,058	504,147	36	25	2	9	10	10

Revised: 1/2/97

File Name: C:\123R3\DATA\96CHFSM

la The numbers in the table do not include:

Four green females and four green males killed for spawning.

Six spawned out females and five spawned out males.

Thirty-eight males and 11 females released at the end of the spawning season.

One female and six males killed for CWT recovery at the end of the spawning season

Six females and six males unaccounted for. It is assumed they escaped through a drain line.

Appendix M. Liberation and survival information for summer steelhead released in the Umatilla River.

Brood	Number Released	Date of Release	Size at Release	Number Tagged	CWT	Code	Release Location	%	Total	Estimated Adult Survival			
										Idaho & Canada	Oregon		
											Col.R Net	Col.R Sport	Umatilla River
87	10,187	Apr 88	7.4	9,829	073859		Minthom	0.57	58	0	12	0	46
07	10,075	Apr 88	7.4	9,721	073860		Minthom	0.81	82	0	35	0	47
07	<u>10,287</u>	Apr 88	7.4	<u>9,925</u>	073861		Minthom	<u>0.70</u>	<u>72</u>	<u>0</u>	<u>21</u>	<u>2</u>	<u>49</u>
Total	30,549			29,475				0.69	212	0	68	2	142
87	10,423	Apr 88	6.5	9,689	073856		Nr. Minthom	0.75	78	2	12	11	53
87	10,171	Apr 88	6.5	9,455	073857		Nr. Minthom	0.51	52	1	8	0	43
a7	<u>10,163</u>	Apr 88	6.5	<u>9,448</u>	073858		Nr. Minthom	<u>0.31</u>	<u>32</u>	<u>0</u>	<u>0</u>	<u>2</u>	<u>30</u>
Total	30,757			28,592				0.53	162	3	20	13	126
a7	33,984	May 88	10.3	0			Uma RM 23	NA					
88	10,033	Dec 88	57.5	0			Uma RM 09	NA					
a8	17,372	May 89	6.6	8,704	074720		Minthorn	0.06	10	0	0	6	4
88	17,382	May 89	6.6	8,709	074723		Minthorn	0.02	4	0	0	0	4
88	<u>17,372</u>	May 89	6.6	<u>8,784</u>	074724		Minthorn	<u>0.03</u>	<u>6</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>6</u>
Total	52,126 /a			26,357				0.04	20	0	0	6	14
88	9,673	May 89	5.6	8,800	074715		Nr. Minthorn	0.09	9	0	0	0	9
88	9,864	May 89	5.6	8,791	074717		Nr. Minthorn	0.11	11	0	0	0	11
88	<u>9,849</u>	May 89	5.6	<u>8,778</u>	074716		Nr. Minthorn	<u>0.01</u>	<u>1</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>1</u>
Total	29,586			26,369				0.07	21	0	0	0	21
89	20,240	May 90	5.9	9,331	075212		Bonifer	0.87	176	0	22	20	134
89	19,811	May 90	5.9	9,133	075213		Bonifer	0.99	197	0	15	4	170
89	<u>19,696</u>	May 90	5.9	<u>9,080</u>	075214		Bonifer	<u>0.91</u>	<u>180</u>	<u>0</u>	<u>48</u>	<u>13</u>	<u>119</u>
Total	59,747 /b			27,544				0.93	553	0	85	37	431
89	9,830	May 90	5.5	9,511	075215		Nr. Bonifer	0.99	97	0	19	7	71
89	9,845	May 90	5.5	9,525	075216		Nr. Bonifer	1.08	106	0	20	4	82
89	<u>9,771</u>	May 90	5.5	<u>9,454</u>	075217		Nr. Bonifer	<u>0.86</u>	<u>84</u>	<u>0</u>	<u>14</u>	<u>26</u>	<u>44</u>
Total	29,446			28,490				0.97	207	0	53	37	197
90	14,221	May 91	6.2	9,835	075340		Bonifer	0.89	127	0	20	23	84
90	14,196	May 91	6.2	9,019	075341		Bonifer	0.75	106	0	25		71
90	<u>14,191</u>	May 91	6.2	<u>9,814</u>	075342		Bonifer	<u>0.99</u>	<u>140</u>	<u>0</u>	<u>27</u>	3	<u>94</u>
Total	42,610 /c			29,468				0.08	373	0	72	52	249
90	9,754	May 91	6.7	9,432	075343		Nr. Bonifer	0.88	66	0	17	6	63
90	9,790	May 91	0.7	9,467	075344		Nr. Bonifer	0.70	69	0	8	6	55
90	<u>9,781</u>	May 91	0.7	<u>9,458</u>	075345		Nr. Bonifer	<u>0.89</u>	<u>87</u>	<u>0</u>	<u>22</u>	<u>2</u>	<u>63</u>
Total	29,325 /d			20,357				0.83	242	0	47	14	101
91	22,474	Mar 92	5.8	10,394	073759		Bon. & Min.	0.22	50	0	22	4	24
91	22,902	Mar 92	5.8	10,594	073862		Bon. & Min.	0.13	30	0	13	0	17
91	<u>22,059</u>	Mar 92	5.6	<u>10,203</u>	074127		Bon. & Min.	<u>0.25</u>	<u>56</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>56</u>
	67,435			31,191				0.20	136	0	35	4	97
91	22,262	Apr 92	5.0	10,108	075841		Meacham Cr.	0.02	4	0	4	0	0
91	21,365	Apr 92	5.0	9,496	075842		Meacham Cr.	0.00	0	0	0	0	0
91	<u>20,923</u>	Apr 92	5.0	<u>9,747</u>	075843		Meacham Cr.	<u>0.04</u>	<u>9</u>	<u>0</u>	<u>9</u>	<u>0</u>	<u>0</u>
	64,550			29,353				0.02	13	0	13	0	0

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Appendix M. (cont.)

Brood	Number Released	Date of Release	Size at Release	Number Tagged	CWT	Code	Release Location	Estimated Adult Survival					
								%	Total	Idaho & Canada	Oregon		Umatilla River
											Col.R Net	Col.R Sport	
91	22,469	Apr/May 92	5.5	10,562	075636		Meacham Cr.	0.01	2	0	0	0	2
91	22,662	Apr/May 92	5.5	10,275	07563s		Meacham Cr.	0.01	2	0	0	0	2
st	22,266	Apr/May 92	5.5	10,105	075640		Meacham Cr.	0.01	2	0	0	0	2
	67,419 /e			30,942				0.01	6	0	0	0	6
92	15,115	April 93	4.5	10,194	076058		Bonifer	0.69	104	0	15	4	85
92	14,707 14,922	April 93	4.5	9,792	076059		Bonifer	0.43	64	0	3	3	58
		April 93	4.5	9,440	076060		Bonifer	0.78	116	0	0	22	94
	44,624			29,426				0.63	264	0	16	29	237
92	16,016	April 93	5.6	10,031	076055		Minthorn	0.56	90	2	3	0	85
92	15,940	April 93	5.6	9,418	076056		Minthorn	0.60	95	0	2	27	66
92	16,023	April 93	5.6	8,643	076067		Minthorn	0.62	100	0	7	5	88
	47,979			29,092				0.59	205	2	12	32	23s
92	23,662	May 93	6.1	13,117	076052		Bonifer	0.06	15	0	0	0	15
92	21,644	May 93	6.1	11,410	076053		Bonifer	0.10	21	0	0	0	21
92	19,959	May 93	6.1	8,507	076054		Bonifer	0.08	16	0	0	0	16
	65,465			34,434				0.08	52	0	0	0	52
93	24,763	April 94	5.1	9,952	070141		Minthorn	0.23	57	0	0	7	50
93	24,615	April 94	5.1	9,965	070142		Minthorn	0.47	116	2	12	52	50
	49,596 /f			19,917				0.35	173	2	12	59	100
93	26,749	April 94	4.9	10,471	070143		Bonifer	0.31	82	0	10	0	72
93	24,664	April 94	4.9	8,651	070144		Bonifer	0.39	97	0	5	10	82
	51,403 /f			20,122				0.35	17s	0	15	10	154
93	26,347	May 94	5.2	8,595	07013s		Bonifer	0.05	12	0	0	0	12
93	25,750	May 94	5.2	6,400	070140		Bonifer	0.00	0	0	0	0	0
	52,097			16,995				0.02	12	0	0	0	12

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/a The number released includes 22,274 adipose clipped fish at 5.5/lb. acclimated and released at Bonifer in May  
 /b The number released includes 29,522 adipose clipped fish at 7.7/lb. acclimated and released with the coded-wire tagged fish in May  
 /c The number released includes 12,389 adipose clipped fish at 7.5/lb. acclimated and released with the coded-wire tagged fish in May  
 /d The number released does not include 3,996 adipose clipped fish at 12.5/lb. released at Umatilla RM 3 in April  
 /e The number released does not include 5,443 adipose clipped fish at 5.8/lb. released at Umatilla RM 3 in April  
 /f The number released does not include 1,732 adipose clipped fish at 5.7/lb. released at Umatilla RM 27.3 in April

Appendix N. Liberation and survival information for Bonneville URB stock yearling fall chinook salmon released in the Umatilla River (1983-1996). /1

Br. Yr.	Number Released	Date of Release	Sbe at Release	Number Tagged	CWT	Code	Release Location	Estimated Adult Survival R				
								%	Total	Ocean	Col. & Snake R.	Uma.R.
81	100,664	Mar 93	6.9	99,570	072741		Bonifer & Meacham Cr.	0.17	169	69	60	0
82	228,412	Mar 84	8.6	96,448	072829		Bonifer & Meacham Cr.	0.06	178	126	52	0
<b>83</b>	198,162	<b>Mar 85</b>	7.8	<b>88,306</b>	073127		Uma.R.(RM 87) & Bonifer	0.60	<b>1,593</b>	<b>880</b>	711	2
84	206,615	Mar 86	6.0	86,396	072327		Bonifer & Minthorn	3.22	<b>6,663</b>	3,655	2,716	292
<b>85</b>	<b>22,216</b>	Mar 87	8.1	10,103	073823		Minthorn	2.35	521	259	205	57
<b>85</b>	22,523	Mar 87	8.1	10,243	073824		Minthorn	2.07	466	204	229	33
86	21,607	Mar 87	8.1	9,917	<b>073825</b>		Minthorn	2.32	505	246	200	59
65	20,881	Mar 87	8.1	9,496	073826		Minthorn	2.41	<b>504</b>	174	<b>299</b>	<b>31</b>
65	<b>21,716</b>	Mar 87	6.1	<b>9,876</b>	073827		Minthorn	<b>2.18</b>	<b>473</b>	<b>198</b>	<b>235</b>	<b>40</b>
<b>Total</b>	109,143			49,635				2.26	2,469	1,061	1,168	220
<b>85</b>	20,786	<b>Mar 87</b>	<b>8.6</b>	10,253	<b>073828</b>		Bonifer	2.27	472	<b>227</b>	<b>229</b>	16
<b>85</b>	20,212	Mar 87	<b>8.6</b>	9,970	<b>073829</b>		Bonifer	2.28	460	<b>237</b>	<b>207</b>	16
<b>85</b>	20,546	Mar 87	<b>8.6</b>	10,135	<b>073830</b>		Bonifer	2.96	606	292	294	22
<b>85</b>	20,361	Mar 87	<b>8.6</b>	10,053	<b>073831</b>		Bonifer	2.21	451	<b>201</b>	<b>207</b>	<b>43</b>
<b>85</b>	<b>20,438</b>	Mar 87	<b>8.6</b>	<b>10,081</b>	<b>073832</b>		Bonifer	<b>2.48</b>	<b>506</b>	<b>233</b>	<b>243</b>	<b>30</b>
<b>Total</b>	102,363			50,492				2.44	2,497	1,190	1,180	<b>127</b>
<b>86</b>	52,317	<b>Mar 88</b>	8.8	42,068	<b>074038</b>		Minthorn	3.44	1,799	812	512	475
<b>86</b>	<b>48,474</b>	Mar 88	8.8	<b>38,978</b>	074039		Minthorn	<b>3.15</b>	<b>1,526</b>	<b>689</b>	<b>410</b>	<b>427</b>
<b>Total</b>	<b>100,791</b>			81,046				3.30	3,325	1,501	922	902
<b>86</b>	60,480	<b>Mar 88</b>	10.2	39,509	074036		Bonifer	2.47	1,247	<b>602</b>	316	<b>327</b>
<b>86</b>	<b>49,070</b>	Mar 88	10.2	<b>38,405</b>	074037		Bonifer	<b>2.61</b>	<b>1,279</b>	<b>563</b>	<b>394</b>	<b>322</b>
<b>Total</b>	99,550			77,914				2.54	2,526	1,165	712	649
87	217,443	<b>Mar 89</b>	8.6	0			Uma RM 63 & 73.5	NA				
<b>88</b>	255,614	Mar 90	8.2	0			Uma RM 70	NA				
89	194,647	Mar 91	7.8	0			Uma RM 56 to 79	NA				
80	122,639	<b>Mar 92</b>	7.7	26,160	075819		Uma RM 68	0.02	<b>24</b>	<b>0</b>	19	<b>5</b>
90	<b>97,891</b>	Mar 92	7.6	<b>26,178</b>	075618		Uma RM 70	<b>0.02</b>	<b>19</b>	<b>19</b>	Q	<b>0</b>
<b>Total</b>	220,440			52,336				0.02	43	19	19	5
<b>91</b>	66,345	<b>Mar 93</b>	9.0	23,239	071461		Uma RM 73.5	0.05	<b>34</b>	11	<b>3</b>	<b>20</b>
<b>91</b>	<b>68,492</b>	Mar 93	9.2	<b>23,863</b>	071480		Uma RM 73.5	<b>0.03</b>	<b>23</b>	<b>9</b>	<b>3</b>	<b>11</b>
<b>Total</b>	134,837			47,102				0.04	57	20	6	31
<b>92</b>	233,629	Mar 94	10.4	23,699	070255		Uma RM 78.5	0.25	591	39	79	473
92	49,824	<b>Apr 94</b>	8.5	23,470	070252		Uma RM 73.5	0.06	40	0	2	38
<b>93</b>	111,617	<b>Apr 95</b>	7.8	24,665	070858		Thanhollow (RM 73.5)	0.21	<b>234</b>	<b>0</b>	0	<b>234</b>
<b>93</b>	<b>115,271</b>	<b>Apr 95</b>	8.2	<b>24,374</b>	<b>070659</b>		Thanhollow (RM 73.6)	<b>0.11</b>	<b>128</b>	<b>0</b>	Q	<b>128</b>
	227,088			49,239				0.16	362	0	0	362
94	217,294	<b>Apr 96</b>	7.0	28,521	071038		Imeques (RM 80)	0.06	<b>137</b>	0	0	<b>137</b>
94	204,022	Apr 96	7.1	27,397	071037		Thomholbw (RM 73.5)	0.17	350	0	0	<b>350</b>

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/1 Adult returns from the 1990-1994 broods are incomplete.

/2 The data reported in the table are expanded numbers.



Appendix O. Liberation and survival information for Bonneville URB and Umatilla River stock subyearling fall chinook salmon released in the Umatilla River (1984-1993). /1

Sr. Yr. Stock /2	Number Released	Date or Release	Size at Release	Number Tagged	CWT Code	Release Location	Estimated Adult Survival /3				
							%	Total	Ocean	cot. & Snake R. Umatilla R.	
83 B	966,250	Jun 84	85.1	210,441	073124	Umatilla R. (RM 1.5)	0.79	7,599	2,411	5,166	0
84 B	3,223,172	Jun 85	92.3	206,756	073326	Umatilla R. (RM 1.5)	0.87	28,170	11,115	17,008	47
84 B	51,000	Oct 85	16.2	30,838	073162	Bonifer	0.67	344	149	192	3
85 B	35,574	Oct 86	11.6	0		Minthorn	NA				
85 B	197,432	Jun 86	86.0	20,636	073833	Umatilla R. (RM 1.5)	0.75	1,473	526	947	0
85 B			86.0	21,335	073834	Umatilla R. (RM 1.5)	0.38	753	381	372	0
85 B	198,468	Jun 86	86.0	20,690	073835	Umatilla R. (RM 1.5)	0.37	735	372	363	0
85 B	196,952	Jun 86	86.0	20,170	073836	Umatilla R. (RM 1.5)	0.51	996	254	742	0
85 B	197,788	Jun 86	86.0	20,982	073837	Umatilla R. (RM 1.5)	0.51	1,009	255	754	0
85 B	208,103	Jun 86	86.0	20,815	073838	Umatilla R. (RM 1.5)	0.39	810	330	480	0
85 B	208,958	Jun 86	86.0	21,658	073839	Umatilla R. (RM 1.5)	0.55	1,148	289	859	0
85 B	207,550	Jun 86	86.0	20,269	073840	Umatilla R. (RM 1.5)	0.58	1,167	635	532	0
85 B	206,184	Jun 86	86.0	20,895	073841	Umatilla R. (RM 1.5)	0.61	1,265	149	1,116	0
85 B	208,994	Jun 86	86.0	21,694	073842	Umatilla R. (RM 1.5)	0.44	925	289	636	0
Total	2,029,602			209,145			0.51	10,281	3,460	6,801	0
870	1,429,250 /4	Jun 88	93.1	0		Umatilla R. (RM 1.5)	NA				
89 B	806,567	May-Jun 90	97.5	52,612	075403	Umatilla R. (RM 70 & 79)	0.23	1,829	676	984	169
89 B	808,560	May-Jun 90	97.5	53,160	075404	Umatilla R. (RM 70 & 79)	0.21	1,733	684	958	91
89 B	808,554	May-Jun 90	97.5	53,248	075405	Umatilla R. (RM 70 & 79)	0.13	1,063	577	334	152
Total	2,425,681			159,020			0.19	4,625	1,937	2,276	412
89 B	25,311	Oct 90	9.2	23,396	075325	Minthorn	0.03	7	4	2	1
89 B	23,724	Oct 90	9.2	21,929	075326	Minthorn	0.11	26	12	12	2
89 B	22,828	Oct 90	9.2	21,101	075327	Minthorn	0.07	15	2	9	4
Total	71,863			66,426			0.07	46	18	23	7
89 B	25,472	Oct 90	6.8	23,413	076322	Nr. Minthorn	0.05	12	3	9	0
89 B	25,641	Oct 90	8.8	23,617	076323	Nr. Minthorn	0.00	1	0	1	0
89 B	25,480	Oct 90	8.8	23,420	075324	Nr. Minthorn	0.07	17	14	2	1
Total	76,646			70,450			0.04	30	17	12	1
90 B	1,343,311	May 91	82.0	52,252	075225	Umatilla R. (RM 70 & 79)	0.18	2,468	437	1,594	437
90 B	1,343,042	May 91	82.0	51,728	075226	Umatilla R. (RM 70 & 79)	0.19	2,493	753	1,532	208
90 B	100,642	May 91	73.0	48,266	075320	Umatilla R. (RM 70 & 79)	0.35	351	111	202	38
90 B	99,962	May 91	73.0	48,481	075449	Umatilla R. (RM 70 & 79)	0.21	212	76	95	41
90 B	99,225	May 91	73.0	48,301	070016	Umatilla R. (RM 70 & 79)	0.28	275	82	166	25
90 B	52,326	May 91	82.0	51,614	075460	Umatilla R. (RM 70)	0.24	123	57	40	26
90 B	52,706	May 91	82.0	52,444	075451	Umatilla R. (RM 70)	0.31	163	72	77	14
Total	3,091,214 /5			353,286			0.20	6,065	1,588	3,708	789
90 B	26,481	May 91	80.5	26,173	075553	Minthorn	0.14	37	16	14	7
90 B	26,586	May 91	80.5	24,762	075801	Minthorn	0.39	105	33	67	5
90 B	26,606	May 91	80.5	25,476	075802	Minthorn	0.22	59	29	20	10
Total	79,672			76,411			0.25	201	78	101	22
90 B	25,662	May 91	86.0	25,720	075660	Nr. Minthorn	0.17	44	17	22	5
90 B	25,708	May 91	86.0	25,425	075661	Nr. Minthorn	0.16	40	16	20	4
90 B	23,295	May 91	86.0	22,309	075662	Nr. Minthorn	0.18	42	18	16	8
Total	74,865			73,454			0.17	126	51	58	17

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Appendix O. (cont.)

a. Yr. Stock /2	Number Released	Date of Release	Size at Release	Number Tagged	CWT Code	Release Location	Estimated Adult Survival /3				
							%	Total	Ocean	Col. & Snake R.	Uma R.
91 B	286,578	May92	70.6	31,892	071429	Umatilla R. (RM 42.5)	0.00	9	0	0	9
01 B	281,350	May92	66.1	32,287	071430	Umatilla R. (RM 42.5)	0.00	9	0	0	9
91 B	182,931	May92	66.2	28,951	071431	Umatilla R. (RM 42.5)	0.00	0	0	0	0
01 B	191,257	May 92	68.3	29,425	071432	Umatilla R. (RM 42.5)	0.00	0	0	0	0
91 B	303,878	May92	61.0	29,066	071433	Umatilla R. (RM 42.5)	0.00	0	0	0	0
01 B	306,802	May92	65.7	31,224	071434	Umatilla R. (RM 42.5)	0.00	0	0	0	0
01 B	297,331	May92	60.9	30,326	071436	Umatilla R. (RM 42.5)	0.00	0	0	0	0
01 B	302,555	May92	61.9	30,365	071436	Umatilla R. (RM 42.5)	0.00	10	0	0	10
91 B	223,830	May 92	55.2	30,508	071437	Umatilla R. (RM 42.5)	0.00	7	0	0	7
01 B	301,831		64.5	30,924	071438	Umatilla R. (RM 42.5)	0.00	0	0	0	0
	2,678,343 /6			304,968			0.00	35	0	0	35
91 u	504,369 /7	May 92	63.4	0		Umatilla R. (RM 42.5)	NA				
92 B&U	292,895	May93	63.0	28,964	076330	Umatilla R. (RM 73.5)	0.02	71	0	51	20
92 B&U	269,336	May93	62.9	27,092	070127	Umatilla R. (RM 73.5)	0.04	129	60	0	60
92 B&U	282,175	May 93	68.0	29,958	076334	Umatilla R. (RM 73.5)	0.02	57	0	0	57
92 B&U	282,125	May 93	67.3	29,537	076331	Umatilla R. (RM 73.5)	0.03	86	0	19	67
92 B&U	273,662	May 93	60.3	29,718	076333	Umatilla R. (RM 73.5)	0.05	128	18	64	46
92 B&U	277,931	May 93	61.5	29,451	076332	Umatilla R. (RM 73.5)	0.03	75	0	9	66
92 B&U	268,001	May 93	59.3	29,594	070125	Umatilla R. (RM 73.5)	0.03	81	0	18	63
92 B&U	203,731	May93	66.7	30,708	076329	Umatilla R. (RM 73.5)	0.03	81	7	27	27
92 Emu	272,496	May93	60.3	29,360	070125	Umatilla R. (RM 73.5)	0.05	149	84	9	56
92 B&U	207,565	May93	59.4	30,462	076335	Umatilla R. (RM 73.5)	0.05	102	27	0	75
	2,629,917 /8			294,842			0.04	930	198	197	537

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/1 Adult returns from the 1990-1992 brood years are incomplete.

/2 B = Bonneville URB stock; U = Umatilla River stock

/3 The data reported in the table are expanded numbers.

/4 These fish were not coded - wire tagged.

/5 The number released does not include 14,462 non-tagged fish at 80-194/lb. released at Umatilla RM 3 in April and May.

/6 The number released does not include 2,670 non-tagged fish at 112/lb. released at Umatilla RM 3 in April and May.

/7 The number released does not include 5,167 non-tagged fish at 62.8/lb. released at Umatilla RM 3 in April and May.

/8 The number released does not include 29,681 non-tagged fish at 95.5-142.0/lb. released between Umatilla RM 0 and RM 27.3 in April and May.

Appendix P. Liberation and survival information for Priest Rapids URB and Umatilla River stock fall chinook salmon released in the Umatilla River (1987-1996). /1

Br. Yr. Stock/2	Number Released	Date of Release	Size at Release	Number Tagged	CWT	Code	Release Location	Estimated Adult Survival /3				
								%	Total	Ocean	Snake A.	Uma.R.
86 P	497,572	May 87	60.4	40,793	073912		Umatilla R. (RM 1.5)	0.71	3,549	1,537	1,939	73
86 P	501,266	May 87	60.4	41,096	073913		Umatilla R. (RM 1.5)	0.88	4,416	1,964	2,403	49
86 P	477,992	May 87	60.4	39,187	073914		Umatilla R. (RM 1.5)	0.86	4,099	2,086	1,891	122
Total	1,476,830			121,076				0.82	12,064	5,587	6,233	244
86 P	6 7 0	July 87	20.0	6 4 3	073915		Minthorn	0.00	0		0	0
86 P	6 7 2	July 87	20.0	645	073916		Minthorn	0.00	0	8	0	0
86 P	658	July 87	20.0	632	074035		Minthorn	0.79	5	0	5	0
Total	2,000			1,920				0.25	5	0	6	0
87 P	1,886,757	May 88	68.3	198,285	075007		Umatilla R. (RM 23)	0.07	1,399	752	504	143
87 P	4,823	Nov 88	9.8	4,438	074539		Minthorn	0.43	21	11	9	1
87 P	4,660	Nov 88	9.8	4,289	074540		Minthorn	0.23	10	4	5	1
87 P	4,925	Nov 88	9.8	4,533	074541		Minthorn	0.62	31	21	10	0
Total	14,408			13,260				0.43	62	36	24	2
87 P	26,658	Nov 88	8.6	24,656	074633		Nr. Minthorn	0.41	109	45	50	14
87 P	25,493	Nov 88	8.6	23,403	074537		Nr. Minthorn	0.62	156	98	41	17
87 P	27,330	Nov 88	8.6	25,089	074538		Nr. Minthorn	0.53	144	62	60	22
Total	79,681			73,148				0.51	409	205	151	53
88 P	797,904	May 89	66.6	52,228	074646		Umatilla R. (RM 23)	0.12	978	443	428	107
88 P	797,903	May 89	66.6	49,771	074647		Umatilla R. (RM 23)	0.13	1,026	465	497	64
88 P	797,903	May 89	66.6	52,244	a74648		Umatilla R. (RM 23)	0.11	886	428	443	15
Total	2,393,710			154,243				0.12	2,890	1,336	1,368	186
88 P	26,770	Oct 89	10.9	26,358	074753		Minthorn	0.13	33	15	16	2
88 P	26,617	Oct 89	10.9	25,028	074754		Minthorn	0.10	27	6	14	7
88 P	25,438	Oct 89	10.9	25,438	074767		Minthorn	0.07	19	4	8	7
Total	78,825			76,824				0.10	79	25	38	16
88 P	27,071	Oct 89	11.1	26,790	074758		Nr. Minthorn	0.10	27	11	12	4
88 P	25,428	Oct 89	11.1	24,285	074760		Nr. Minthorn	0.09	24	16	7	1
88 P	25,633	Oct 89	11.1	25,350	074763		Nr. Minthorn	0.06	16	7	5	4
Total	78,132			76,425				0.09	67	34	24	9
89 P	629,800 /4	May 90	82.4	0			Umatilla R. (RM 70 & 79)	NA				
93 P & U	322,867	May 94	63.0	31,162	070663		Umatilla R. (RM 73.5)	0.01	21	0	0	21
93 P & U	327,700	May 94	72.4	31,658	070719		Umatilla R. (RM 73.5)	0.03	82	0	10	72
93 P & U	314,518	May 94	65.4	30,528	070720		Umatilla R. (RM 73.5)	0.03	83	0	21	62
93 P & U	326,408	May 94	66.2	30,447	070723		Umatilla R. (RM 73.5)	0.02	54	0	11	43
93 P & U	303,843	May 94	88.0	30,950	070722		Umatilla R. (RM 73.5)	0.03	79	0	10	69
93 P & U	306,105	May 94	68.7	28,474	070721		Umatilla R. (RM 73.5)	0.02	54	0	22	32
93 P & U	280,046	May 94	60.1	31,239	070662		Umatilla R. (RM 73.5)	0.02	45	0	9	36
93 P & U	279,965	May 94	64.2	31,040	070718		Umatilla R. (RM 73.5)	0.01	27	0	0	27
93 P & U	191,321	May 94	59.1	30,502	070716		Umatilla R. (RM 73.5)	0.02	38	13	0	25
93 P & U	190,439	May 94	60.0	32,481	070717		Umatilla R. (RM 73.5)	0.03	59	0	6	53
Total	2,843,212 /5			308,481				0.02	542	13	89	440

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Appendix P. (cont.)

Br. Yr. Stock/2		Number Released	Date of Release	Size at Release	Number Tagged	CWT Code	Release Location	Estimated Adult Survival /3				
								%	Total	Ocean	Snake R.	Uma.R.
94	P	287,313	May 95	63.0	26,623	071023	Thornhollow (RM 73.5)	0.00	0	0	0	0
94	P	274,110	May 95	66.5	29,764	071025	Thornhollow (RM 73.5)	0.00	0	0	0	0
		561,423						0.00	0	0	0	0
94	P	271,129	May 95	67.8	29,736	071017	Imeques (RM 80)	0.00	8	0	0	0
94	P	241,342	May 95	65.1	29,132	071018	Imeques (RM 80)	0.00	0	0	0	0
94	P	266,459	May 95	62.7	29,353	071019	Imeques (RM 80)	0.00	0	0	0	0
94	P	275,613	May 95	65.6	29,460	071020	Imeques (RM 80)	0.00	0	0	0	0
94	P	152,696	May 95	58.7	29,327	071021	Imeques (RM 80)	0.00	0	8	0	0
94	P	260,406	May 95	63.0	26,472	071022	Imeques (RM 80)	0.00	0	0	0	0
94	P	151,943	May 95	62.3	36,294	071024	Imeques (RM 80)	0.00	0	0	0	0
94	P	245,665	May 95	58.0	33,122	071026	Imeques (RM 80)	0.00	0	0	0	0
		1,904,875			235,790			0.00	0	0	0	0
94	P	46,499	Apr 96	6.3	23,236	071039	Imeques (RM 80)	0.00	2	0	0	2
94	P	47,463	Apr 96	4.7	23,442	071040	Imeques (RM 80)	0.02	10	0	0	10
94	P	47,125	Apr 96	6.3	23,343	071041	Imeques (RM 80)	0.04	20	0	0	20
		143,067			70,623			0.02	32	0	0	32

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/1 Adult returns from the 1993 - 1994 brood years are incomplete.

/2 P = Priest Rapids stock; U = Umatilla River stock.

/3 The data reported in the table are expanded numbers.

/4 These fish were not coded - wire tagged.

/5 The number released does not include 22,174 non-tagged fish at 85 - 171/lb. released in April and May at RM 27.3 and 32.6.

Appendix Q. Liberation and survival information for spring chinook salmon released in the Umatilla River (1988-1996).

Brood	Number Released	Date of Release	Size at Release	Number Tagged	CWT Code	Release Location	Estimated Adult Survival /a			
							%	Total	Columbia snake Rivers	Umatilla River
<b>86</b>	99,895	<b>April 88</b>	20.6	0		<b>U ma.R. (RM 23)</b>	NA			
86	35,946	<b>Mar-Apr 88</b>	10.1	26,640	074325	Bonifer	0.95	342	34	306
<b>86</b>	35,146	<b>Mar-Apr 88</b>	10.1	25,663	074326	Bonifa	<b>0.94</b>	<b>332</b>	<b>98</b>	<b>234</b>
86	<b>35,137</b>	<b>Mar-Apr 88</b>	10.1	<b>25,853</b>	<b>074327</b>	Bonifer	<b>0.94</b>	<b>332</b>	<b>53</b>	<b>279</b>
Total	106,231			76,356			0.95	1006	<b>185</b>	821
66	64,142	<b>April 88</b>	8.6	26,319	074328	<b>Uma.R. (RM 23-81)</b>	0.65	419	53	366
86	62,991	<b>April 88</b>	6.6	25,722	074329	<b>Uma.R. (RM 23-81)</b>	<b>0.48</b>	<b>304</b>	<b>86</b>	218
86	<b>64,013</b>	<b>April 88</b>	8.6	<b>26,252</b>	074330	<b>Uma.R. (RM 23-81)</b>	<b>0.92</b>	<b>588</b>	<b>95</b>	<b>493</b>
Total	191,146	lb		76,293			<b>0.69</b>	1311	234	1077
<b>87</b>	416	<b>Nov 88</b>	21.4	410	074420	Bonifa	0.00	<b>0</b>	<b>0</b>	0
87	<b>399</b>	<b>Nov 88</b>	21.4	<b>393</b>		Bonifer	0.25	<b>1</b>	<b>0</b>	<b>1</b>
87	<b>381</b>	<b>Nov 88</b>	21.4	<b>376</b>	074423 074424	Bonifer	<b>0.26</b>	<b>1</b>	<b>0</b>	<b>1</b>
Total	1,196			1,179			0.17	<b>2</b>	<b>0</b>	2
<b>87</b>	<b>26,109</b>	<b>Nov 88</b>	11.1	25,907	074427	<b>Uma.R. (RM 69)</b>	0.06	15	<b>0</b>	<b>15</b>
87	24,183	<b>Nov 88</b>	11.1	24,070	<b>074429</b>	<b>Uma.R. (RM 89)</b>	0.12	26	<b>3</b>	<b>25</b>
87	<b>25,475</b>	<b>Nov 88</b>	11.1	<b>25,356</b>	074430	<b>Uma.R. (RM 89)</b>	<b>0.09</b>	<b>22</b>	<b>0</b>	22
Total	75,767			75,413			0.09	65	<b>3</b>	62
07	26,135	<b>Mar-May 89</b>	10.6	25,427	074433	Bonifer	0.35	92	11	81
87	27,756	<b>Mar-May 89</b>	10.6	27,004	074434	Bonifer	0.25	69	9	<b>60</b>
87	<b>26,093</b>	<b>Mar-May 89</b>	10.6	<b>25,386</b>	074436	Bonifer	<b>0.25</b>	<b>66</b>	<b>14</b>	<b>52</b>
Total	79,904			77,617			0.26	227	34	193
a7	26,153	<b>March 89</b>	10.6	27,565	074439	Nr. Bonifer	0.32	90	24	66
<b>87</b>	28,116	<b>March 89</b>	10.6	27,550	074440	Nr. Bonifer	<b>0.33</b>	<b>94</b>	<b>16</b>	<b>78</b>
87	<b>24,663</b>	<b>March 89</b>	10.6	<b>24,165</b>	074443	Nr. Bonifer	<b>0.35</b>	<b>86</b>	<b>15</b>	<b>71</b>
Total	60,932			79,300			0.33	270	55	215
<b>88</b>	24,966	<b>Oct 89</b>	12.0	24,801	075063	Bonifer	0.07	17	11	6
<b>88</b>	26,299	<b>Oct 89</b>	12.0	26,109	075101	Bonifer	0.12	35	<b>4</b>	31
<b>88</b>	<b>27,483</b>	<b>Oct 89</b>	12.0	<b>27,299</b>	075102	Bonifer	<b>0.09</b>	<b>25</b>	<b>5</b>	<b>20</b>
Total	80,750			80,209			0.10	77	20	57
Ea	27,207	<b>Oct 89</b>	12.0	27,137	075103	Nr. Bonifs	0.07	18	2	16
<b>88</b>	20,710	<b>Oct 89</b>	12.0	26,560	075104	Nr. Bonifa	0.11	<b>32</b>	16	<b>16</b>
<b>88</b>	<b>27,848</b>	<b>Oct 89</b>	12.0	<b>27,695</b>	075105	Nr. Boniter	<b>0.05</b>	<b>13</b>	<b>0</b>	<b>13</b>
Total	63,653			83,392			0.05	63	18	45
<b>88</b>	99,775	<b>April 90</b>	18.6	0		<b>Uma.R. (RM 23)</b>	NA			
<b>88</b>	38,224	<b>March 90</b>	9.0	26,636	<b>075106</b>	Bonifer	0.49	186	37	149
<b>88</b>	37,538	<b>March 90</b>	9.0	26,160	075107	Bonifer	<b>0.65</b>	<b>244</b>	<b>59</b>	<b>185</b>
<b>88</b>	<b>38,583</b>	<b>March 90</b>	9.0	<b>26,888</b>	076108	Bonifer	<b>0.47</b>	<b>183</b>	<b>48</b>	<b>135</b>
Total	114,345			79,686			0.54	613	144	469
88	39,012	<b>March 90</b>	9.6	25,611	075109	Nr. Bonifer	0.73	283	61	222
<b>88</b>	40,072	<b>March 90</b>	9.6	26,307	075110	Nr. Bonifa	0.75	<b>302</b>	<b>84</b>	218
a0	<b>38,343</b>	<b>March 90</b>	9.6	<b>25,172</b>	075111	Nr. Bonifsr	<b>0.54</b>	<b>208</b>	<b>60</b>	<b>148</b>
Total	117,427			77,090			0.68	793	205	588

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## Appendix Q. (Cont.)

Brood	Number Released	Date of Release	Size at Release	Number Tagged	CWT Code	Release Location	Estimated Adult Survival /a			
							%	Total	Columbia & Snake Rivers	Umatilla River
89	26,757	Oct 90	11.5	26,670	074505	Bonifer	0.01	3	0	3
89	26,805	Oct 90	11.5	26,717	074506	Bonifer	0.01	2	0	2
89	<u>26,876</u>	Oct 90	11.6	<u>26,788</u>	074507	Bonifer	<u>0.00</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total	60,436			80,175			0.01	5	0	5
69	26,050	Oct 90	13.4	25,876	074508	Nr. Bonifer	0.01	2	2	0
89	26,279	Oct 90	13.4	26,104	074509	Nr. Bonifer	0.00	0	0	0
89	<u>25,669</u>	Oct 90	13.4	<u>25,497</u>	074510	Nr. Bonifer	<u>0.01</u>	<u>2</u>	<u>0</u>	<u>2</u>
Total	77,996			77,477			0.01	4	2	2
69	33,473	Mar 91	10.1	25,947	075114	Bonifer	0.24	62	19	63
69	33,440	Mar 91	10.1	25,921	075115	Bonifer	0.22	72	6	66
89	<u>33,593</u>	Mar 91	10.1	<u>26,039</u>	075116	Bonifer	<u>0.25</u>	<u>83</u>	<u>6</u>	<u>77</u>
Total	100,506			77,907			0.24	237	31	206
89	31,932	Mar 91	11.6	24,365	075440	Nr. Bonifer	0.15	47	0	47
89	32,167	Mar 91	11.8	24,559	075441	Nr. Bonifer	0.21	66	11 /c	55
89	<u>32,032</u>	Mar 91	11.6	<u>24,441</u>	075442	Nr. Bonifer	<u>0.18</u>	<u>58</u>	<u>7</u>	<u>51</u>
Total	96,151			73,365			0.18	171	16	153
89	96,733	Apr-May 91	20.3	23,797	635661	Uma.R. (RM 3 & 89)				
90	27,040	Nov 91	16.5	26,769	075626	Bonifer	0.06	22	0	22
90	27,007	Nov 91	16.5	26,737	075627	Bonifer	0.06	16	0	16
90	<u>27,096</u>	Nov 91	16.5	<u>26,027</u>	075020	Bonifer	<u>0.10</u>	<u>26</u>	<u>0</u>	<u>26</u>
Total	81,145			80,333			0.08	64	0	64
90	26,019	Nov 91	16.8	25,499	075829	Nr. Bonifer	0.05	12	0	12
90	25,900	Nov 91	16.6	25,382	075830	Nr. Bonifer	0.06	16	0	16
90	<u>25,900</u>	Nov 91	16.6	<u>26,029</u>	075831	Nr. Bonifer	<u>0.04</u>	<u>11</u>	<u>0</u>	<u>11</u>
Total	78,480			76,910			0.05	39	0	39
90	96,254	Apr-May 92	10.7	31,851	633962	Uma.R. (RM 3 & 89)	0.00	0	0	0
90	36,351	April 92	9.2	26,570	075835	Bonifer	0.02	6	3	5
90	36,154	April 92	9.2	26,426	075836	Bonifer	0.02	7	0	7
90	<u>36,596</u>	April 92	9.2	<u>26,750</u>	075837	Bonifer	<u>0.04</u>	<u>15</u>	<u>0</u>	<u>15</u>
Total	109,101			79,746			0.03	30	3	27
90	32,994	April 92	8.5	25,503	075832	Meacham Cr. (RM 0.5)	0.03	9	1	8
90	32,953	April 92	a.5	25,472	075833	Meacham Cr. (RM 0.5)	0.04	12	6	6
90	<u>32,982</u>	April 92	a.5	<u>25,493</u>	075834	Meacham Cr. (RM 0.5)	<u>0.01</u>	<u>4</u>	<u>0</u>	<u>4</u>
Total	96,929			76,468			0.03	25	7	16
91	294,458	May 92	32.5	0		Uma.R. (RM 80)	NA			
91	97,013	May 92	32.1	50,611	071443	Uma.R. (RM 80)	0.00	0	0	0
91	63,585	May 92	31.2	48,051	071444	Uma.R. (RM 80)	0.00	0	0	0
91	63,305	May 92	32.2	49,498	071445	Uma.R. (RM 80)	0.00	0	0	0
91	95,456	May 92	32.1	50,045	071446	Uma.R. (RM 60)	0.00	0	0	0
91	104,670	May 92	36.4	50,047	071447	Uma.R. (RM 80)	0.00	0	0	0
91	104,929	May 92	36.3	51,707	071448	Uma.R. (RM 80)	0.00	0	0	0
91	109,526	May 92	38.3	51,518	071449	Uma.R. (AM 80)	0.00	0	0	0
91	109,997	May 92	37.6	51,271	071450	Uma.R. (RM 60)	0.00	0	0	0
91	96,617	May 92	39.2	52,128	071451	Uma.R. (RM 80)	0.00	0	0	0
91	<u>106,652</u>	May 92	36.0	<u>51,659</u>	071452	Uma.R. (RM 80)	<u>0.00</u>	<u>0</u>	<u>0</u>	<u>0</u>
	955,752			506,535			0.00	0	0	0

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## Appendix Q. (Cont)

Brood	Number Released	Date of Release	Size at Release	Number Tagged	CWT Code	Release Location	Estimated Adult Survival /a			
							%	Total	Columbia & Snake Rivers	Umatilla River
91	25,104	Nov 92	13.0	25,104	076042	Uma.R. (RM 80)	0.06	15	1	14
91	25,075	Nov 92	13.0	24,992	076043	Uma.R. (RM 80)	0.05	12	3	9
91	15,730	Nov 92	13.1	15,423	076044	Uma.R. (RM 80)	0.03	5	0	5
91	24,638	Nov 92	9.9	24,638	076045	Uma.R. (RM 80)	0.05	12	0	12
91	24,715	Nov 92	10.0	24,221	076046	Uma.R. (RM 80)	0.08	20	0	20
91	17,667	Nov 92	10.1	17,269	076047	Uma.R. (RM 80)	0.05	8	0	8
	132,929			131,847			0.05	72	4	68
91	50,736	Nov 92	19.3	26,135	071542	Uma.R. (RM 80)	0.00	0	0	0
91	50,660	Nov 92	19.5	25,633	071543	Uma.R. (RM 80)	0.01	6	0	6
	101,416			51,768			0.01	6	0	6
91	92,726	Mar 93	14.5	19,951	071455	Uma.R. (RM 80)	0.23	209	14	195
91	94,220	Mar 93	14.5	20,022	071456	Uma.R. (RM 80)	0.16	155	14	141
	186,946			39,973			0.19	364	28	336
91	50,310	Mar 93	8.2	21,499	075739	Uma.R. (RM 80)	0.01	7	0	7
91	50,109	Mar 93	8.1	20,880	075740	Uma.R. (RM 80)	0.01	7	0	7
91	54,347	Mar 93	8.3	21,157	075741	Uma.R. (RM 80)	0.06	41	0	41
91	54,016	Mar 93	8.6	20,307	075742	Uma.R. (RM 80)	0.04	21	0	21
	206,762			63,843			0.04	76	0	76
91	96,066	April 93	20.3	31,421	635950	Uma.R. (RM 3 to 89)	0.00	0	0	0
92	105,290	June 93	27.0	52,588	076136	Uma.R. (RM 60)	0.00	0	0	0
92	109,473	June 93	27.3	51,680	076135	Uma.R. (AM 80)	0.00	0	0	0
92	113,652	June 93	20.5	52,893	076132	Uma.R. (RM 80)	0.00	0	0	0
92	111,103	June 93	27.1	52,172	076137	Uma.R. (RM 60)	0.00	0	0	0
92	111,333	June 93	27.4	51,963	076134	Uma.R. (RM 80)	0.00	0	0	0
92	116,316	June 93	28.1	52,335	076133	Uma.R. (RM 80)	0.00	0	0	0
	667,367			313,631			0.00	0	0	0
92	49,694	Nov 93	20.3	34,541	070159	Uma.R. (RM 80)	0.01	4	0	4
92	52,211	Nov 93	21.5	35,657	070161	Uma.R. (RM 80)	0.00	0	0	0
92	47,667	Nov 93	20.6	36,102	070216	Uma.R. (RM 60)	0.01	5	0	5
92	49,081	Nov 93	20.9	35,408	070160	Uma.R. (RM 80)	0.01	4	0	4
92	46,343	Nov 93	20.2	35,467	070162	Uma.R. (RM 60)	0.03	14	0	14
92	49,316	Nov 93	20.8	36,157	070163	Uma.R. (RM 80)	0.00	0	0	0
92	40,661	Nov 93	16.5	35,710	070155	Uma.R. (RM 80)	0.01	3	0	3
92	39,656	Nov 93	18.0	34,857	070157	Uma.R. (RM 80)	0.00	0	0	0
92	42,734	Nov 93	18.6	33,999	070156	Uma.R. (RM 60)	0.00	0	0	0
92	41,244	Nov 93	19.2	34,130	070168	Uma.R. (RM 80)	0.01	4	0	4
	460,609			352,028			0.01	34	0	34
92	51,936	March 94	8.4	20,982	070220	Uma.R. (RM 80)	0.11	57	0	57
92	52,620	March 94	6.6	20,971	070219	Uma.R. (RM 80)	0.05	25	0	25
92	51,210	March 94	8.6	20,070	070217	Uma.R. (RM 80)	0.00	0	0	0
92	49,375	March 94	6.1	19,920	070218	Uma.R. (RM 80)	0.08	40	0	40
	205,143			81,943			0.06	122	0	122
92	75,635	March 94	11.5	26,305	070251	Uma.R. (RM 73.5)	0.52	395	9	386
92	77,019	March 94	11.5	26,716	070250	Uma.R. (RM 73.5)	0.52	404	0	404
	152,654			53,021			0.52	799	9	790
92	130,925	March 94	12.3	20,219	075945	Uma.R. (RM 80)	0.40	524	6	518
92	130,213	March 94	12.3	20,109	075944	Uma.R. (RM 60)	0.55	719	0	719
	261,138 /e			40,328			0.48	1243	6	1237

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Appendix Q. (Cont.)

Brood	Number Released	Date of Release	Size at Release	Number Tagged	CWT Code	Release Location	%	Estimated Adult Survival /a		
								Total	Columbia & Snake Rivers	Umatilla River
93	140,591	May 94	30.7	49,726	070734	Imeques (RM 80)	0.00	0	0	0
93	141,901	May 94	30.7	52,298	070735	Imeques (RM 80)	0.00	0	0	0
93	139,717	May 94	30.1	52,636	070736	Imeques (RM 80)	0.00	0	0	0
93	142,513	May 94	30.1	53,172	070737	Imeques (RM 80)	0.00	0	0	0
93	139,607	May 94	30.6	51,042	070739	Imeques (RM 80)	0.00	0	0	0
93	<u>134,968</u>	May 94	30.5	<u>52,317</u>	070739	Imeques (RM 80)	<u>0.00</u>	<u>0</u>	<u>0</u>	<u>0</u>
	839,377			311,191			0.00	0	0	0
93	38,234	Nov 94	9.5	34,808	070728	Imeques (RM 80)	0.00	1	0	1
93	39,551	Nov 94	10.5	35,156	070726	Imeques (RM 80)	0.01	2	0	2
93	39,548	Nov 94	9.0	34,124	070724	Imeques (RM 80)	0.01	3	0	3
93	40,383	Nw 94	9.4	35,160	070729	Imeques (RM 80)	0.00	1	0	1
93	39,487	Nov 94	9.2	34,819	070727	Imeques (RM 80)	0.00	1	0	1
93	39,517	Nov 94	9.3	34,827	070725	Imeques (RM 80)	0.01	5	0	5
93	37,096	Nov 94	7.8	35,750	070731	Imeques (RM 80)	0.01	3	0	3
93	34,649	Nov 94	9.6	34,220	070733	Imeques (RM 80)	0.01	4	0	4
93	37,073	Nov 94	7.2	34,915	070730	Imeques (RM 80)	0.01	5	0	5
93	<u>32,667</u>	Nov 94	7.4	<u>32,251</u>	070732	Imeques (RM 80)	<u>0.01</u>	<u>2</u>	<u>0</u>	<u>2</u>
	378,225			346,030			0.01	27	0	27
93	123,257	April 95	10.5	22,189	070649	Imeques (RM 60)	0.03	34	6	28
93	<u>124,614</u>	April 95	10.2	<u>24,096</u>	070560	Imeques (RM 80)	<u>0.05</u>	<u>57</u>	<u>0</u>	<u>57</u>
	247,871			46,277			0.06	137	6	131
93	49,001	March 95	8.3	1 a.864	070651	Imeques (RM 80)	0.00	0	0	0
93	44,077	March 95	7.4	19,052	070652	Imeques (RM 80)	0.00	0	0	0
93	47,846	March 95	7.9	19,091	070654	Imeques (RM 80)	0.01	3	3	0
93	<u>44,188</u>	March 95	a.2	<u>18,175</u>	070653	Imeques (RM 80)	0.03	15	0	15
93	50,007	March 95	7.5	20,315	071453	Imeques (RM 80)	0.00	2	0	2
93	<u>40,685</u>	March 95	6.1	<u>15,661</u>	071454	Imeques (RM 80)	<u>0.01</u>	<u>3</u>	<u>0</u>	<u>3</u>
	275,604			111,158			0.09	217	9	208
93	74,735	March 95	14.4	23,607	070660	Imeques (RM 80)	0.03	24	15	9
93	74,921	April 95	11.4	<u>28,765</u>	070661	Imeques (RM 80)	0.02	15	5	10

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/a The data reported in the table are expanded numbers

/b The number released includes 89,268 non-tagged fish at 10.3/lb. released in the upper Umatilla River in April, 1988

/c Includes 4 from Alaskan commercial fishery

/d The same coded-wire tag code was released both in the Wind River (Washington) and Umatilla River. This eliminates any possible evaluation of survival from the Umatilla River.

/e The number released includes a.890 non-tagged fish et a.1 to 8.3/lb. released at Umatilla RM 3 and 29.2 in March and April.



Appendix R. Liberation and survival information for coho salmon released in the Umatilla River (1987-1996). /a

Brood	Number Released	Date of Release	Size at Release	Number tagged	CWT Code	Release Location	Estimated Adult Survival /b			
							%	Total	ocean	Col.R. Umat.R.
85	212266	Apr 87	13.5	13,440	073617	Minthorn	1.94	4122	1974	1911 237
86	313,961	Apr 87	13.5	19,879	073624	Minthorn	1.68	5259	3048	2053 158
86	422,322	Apr 87	13.6	26,740	073625	Minthorn	1.55	6555	3822	2543 190
Total	940,549 /c			60,059			1.66	15936	6644	6507 585
86	334,038	Mar-Apr 88	16.8	20,592	074366	Umat RM 9 & 23	4.67	15606	2679	4088 2639
86	360,689	Mar-Apr 88	17.3	18,963	074357	Umat RM 9 & 23	4.44	16015	6521	3652 3842
86	301,706	Mar-m 88	16.7	18,513	074358	Umat RM 9 & 23	4.48	13510	7464	2852 3194
Total	996,433			58,068			4.53	45131	24664	10592 9675
87	629,607	Mar 89	17.2	27,062	074609	Nr. Minthorn	0.57	4690	2790	1316 582
87	72,627	Mar 89	17.3	26,416	074610	Minthorn	1.04	756	533	121 102
87	84,672	Mar 89	19.1	26,739	074611	Minthorn	1.08	918	690	108 120
Total	157,299			53,155			1.06	1674	1223	229 222
88	67,309	Mar80	13.5	26,033	074814	Minthorn	3.07	2069	621	1054 194
88	656,524 Id	Mar 90	13.3	26,661	074813	Umat RM 63 & 70	3.11	26606	11216	13096 2294
88	65,095	Apr 90	11.2	27,226	074615	Minthorn	4.04	2620	1129	1274 225
88	152,974	Mar 91	15.4	24,564	076636	Minthorn	0.20	305	107	61 37
89	449,678	Mar 91	16.5	25,336	075534	Umat RM 56 & 60	0.17	746	302	302 142
89	352,977	Mar 91	16.8	25,407	075533	Umat RM 63 & 70	0.16	556	320	69 167
Total	602,655			50,745			0.16	1302	622	371 309
90	472,221	Mar82	16.5	27,906	075620	Umat RM 66	0.71	3367	1032	1574 761
90	244,615	Mar92	15.7	27,705	075621	Umat RM 60	1.07	2622	909	1066 645
90	244,550	Mar92	15.7	27,458	075622	Umat RM 60	0.75	1844	490	944 410
Total	961,366			63,071			0.61	7633	2431	3586 1616
91	454,794	Apr 93	17.6	20,273	071521	Umat RM 60	0.20	901	0	322 579
91	218,616	Apr 93	17.6	27,021	071522	Umat RM 42.6	0.26	574	0	226 346
91	219,266	Apr 93	17.5	27,964	071523	Umat RM 42.6	0.16	384	47	78 259
Total	892,676			04,076			0.21	1659	47	628 1164
92	416,222	Apr 94	16.1	27,166	070337	Umat RM 42.5	0.23	970	165	339 446
92	233,105	Apr 94	17.0	27,452	070336	Umat RM 60	0.30	705	136	153 416
92	232,776	Apr 94	17.1	27,010	070339	Umat RM 60	0.21	403	95	52 336
	664,105			61,626			0.24	2156	416	544 1196
93	250,970	Mar-Apr96	14.7	26,421	070657	Umat RM 42.6	0.05	114	0	0 114
93	251,135	Mar-Apr 96	14.7	26,361	070558	Umat RM 42.5	0.06	190	0	0 190
83	497,449	March 85	14.5	26,496	070559	Umat RM 60	0.03	169	0	0 169
	999,554 /e			79,300			0.05	473	0	0 473
84	465,769	March 86	17.9	26,660	071150	Umat RM 42.6	0.00	0	0	0 0
94	500,005	April 96	18.0	26,319	071146	Umat RM 60	0.00	0	0	0 0
	511,609	April 96	18.6	25,676	071145	Umat RM 42.5	0.00	0	0	0 0
	1,011,614			52,197			0.00	0	0	0 0

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/a Survival data for the 1993 brood includes age-2 fish only (1996 returns).

/b The data reported in the table are expanded numbers

/c The number released includes 786,660 non-tagged fish at 14.0/lb. released at Umatilla RM 23 in April

/d The number released includes 694,527 non-tagged fish at 14.8/lb. released at Umatilla RM 70 in March and April, and 202,316 non-tagged fish at 14.5/lb. released at Umatilla RM 23 in March

/e The number released does not include 191,854 non-tagged fish at 13.9/lb. released at Umatilla RM 60 in April and 322,869 non-tagged fish at 20.3/lb. released at Umatilla RM 42.5 in February and March. These fish were reared at a different hatchery.